

**Final Report**

**June 2010**

# **Transit Service Impacts**

**of the Base Realignment and Closure Recommendations**

**in the Metropolitan Washington Region**



**Washington Metropolitan Area Transit Authority**



# Acknowledgements

Lead Agency:



**Washington Metropolitan Area Transit  
Authority**

Department of Planning and Joint Development  
Wendy Jia

600 5th Street NW  
Washington, DC 20001

Consultant:



**Parsons Brinckerhoff**

Philip Braum, Project Manager  
Nicholas Schmidt, EIT

1401 K Street NW  
Suite 701  
Washington, DC 20005

The following agencies and stakeholders were  
involved in this project, including, but not limited to:

Alexandria Economic Development Partnership  
Anne Arundel County  
Arlington County  
City of Alexandria  
District Department of Transportation  
Fairfax County Department of Transportation  
Maryland Department of Transportation  
Maryland Transit Administration  
Metropolitan Washington Council of Governments  
Montgomery County Department of Transportation  
Potomac and Rappahannock Transportation  
Commission  
Prince George's County  
Virginia Department of Rail and Public  
Transportation  
Virginia Department of Transportation

**TranSystems**

Alan Castaline  
Jeremy Mendelson  
Shruti Rathore  
Paul Schimek

38 Chauncy Street  
Boston, MA 02111





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# Executive Summary







# Executive Summary

## Purpose

The Washington Metropolitan Area Transit Authority (Metro) initiated a study to provide an analysis of the impacts to and opportunities for regional transit service due to the Base Realignment and Closure (BRAC) process. This process, initiated by Congress in 2005 and currently being executed by the Department of Defense (DoD), will significantly alter employment and

commuting patterns in the area by consolidating tens of thousands of military personnel and civilian employees to selected metropolitan Washington bases no later than September 15, 2011. In response, this study provided a comprehensive assessment of the transit impact of the BRAC process and developed transit service concepts that include new and modified transit service by nine operators as well as operating

and capital cost estimates in FY 2010 dollars. Final decisions on the priority and implementation of the proposed improvements will be subject to the further identification of transit demand at BRAC installations and should be made in collaboration with states, local jurisdictions, transit service providers, and BRAC installations.

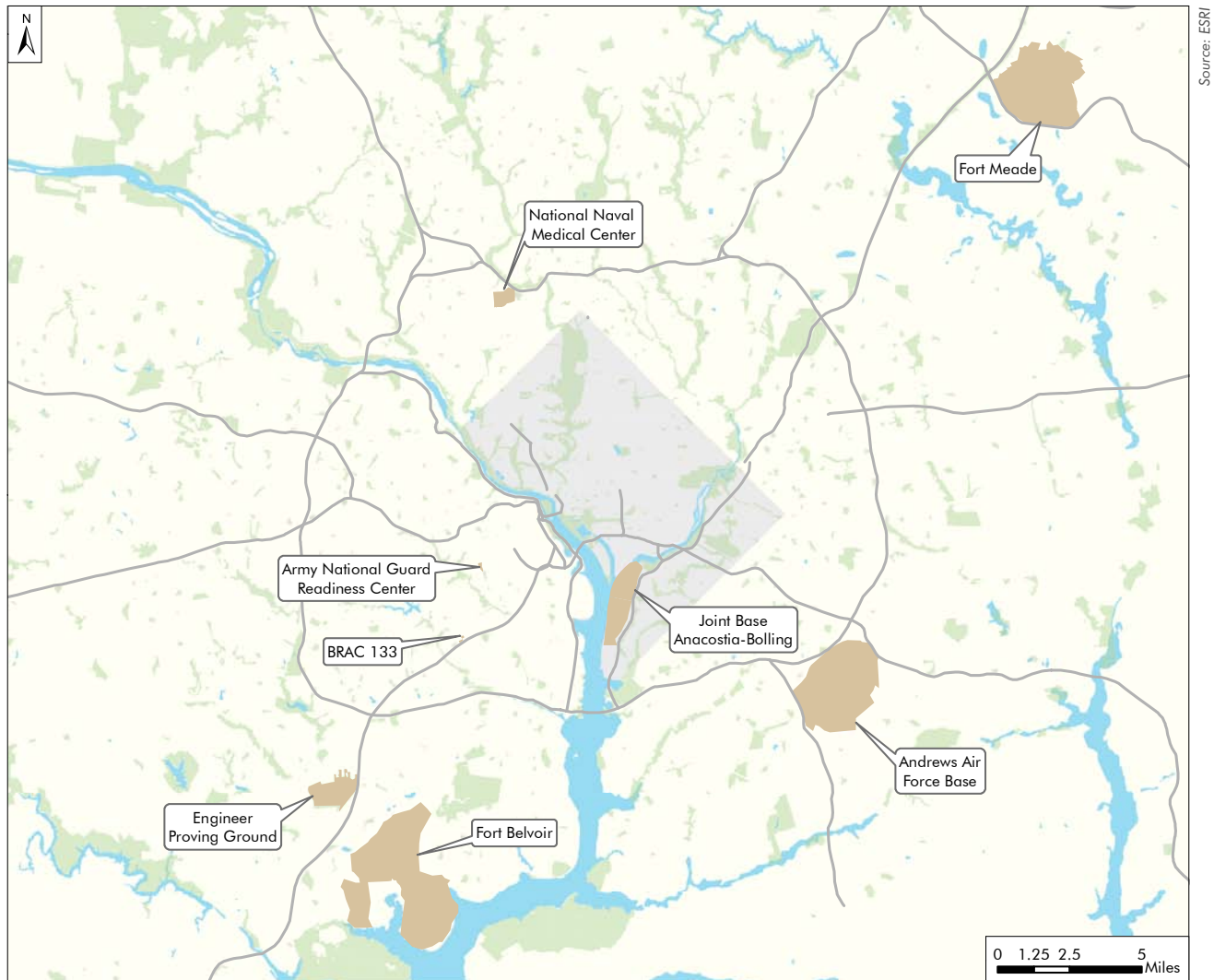


Figure ES-1: Study sites

## Sites

With the help of a Transportation Advisory Committee (TAC) comprising representatives from local and state jurisdictions and transit agencies, the study team selected eight DoD sites that are the focus of this study. Shown in Figure ES-1, these sites include the Army National Guard Readiness Center, BRAC 133 (Mark Center), Engineer Proving Ground, and Fort Belvoir in Virginia; Andrews Air Force Base, Fort Meade, and National Naval Medical Center in Maryland; and Joint Base Anacostia-Bolling in Washington, D.C.

These eight sites were selected because they will experience significant personnel and employee growth. As shown in Table ES-1, the study sites are planned to collectively receive up to 47,000 personnel and employees by 2015, with a majority arriving by September 2011. In all, these eight sites will account for almost 148,000 personnel and employees within five years, a 47 percent increase from the present.

At the same time, employee parking will increase modestly, as required by NCPC or DoD parking guidelines. Where NCPC approval is required, the agency requires a parking supply in line with its previous planning

efforts. In general, NCPC-approved employee parking supplies can vary depending upon the context of the site. For example, NNMC is expected to have limited employee parking because it is located in a semi-urban area of Bethesda, Maryland and is adjacent to a Metrorail station. DoD parking regulations dictate how much parking can be built in all other cases. Data listed in Table ES-1 refer to all parking spaces on site, including spaces designated for employees and personnel, visitors, patients of medical facilities, and operational vehicles. Therefore, in all cases employee and personnel parking is actually slightly lower than listed in the table.

Five of the eight sites have permanent on-base resident populations. As with parking, on-site housing is increasing more modestly, if at all. In some cases the housing stock is being reconstructed in smaller numbers as part of a housing privatization program.

## Demand

This study analyzed and considered many factors in estimating future transit demand at each site:

- Site location
- Present and planned nearby transportation services

- Residences of present and future employees identified via survey or Census data
- Published mode share goals and travel demand management (TDM) programs
- Present transit ridership
- Present and future site characteristics such as employees, parking, and housing

Of all these factors, parking availability was more important in estimating potential transit demand, particularly as parking is not expected to keep pace with rapid employee growth. The lack of parking supply, while challenging to each base, can serve as a TDM tool when combined with a comprehensive, site-specific TDM program and an adequate level of transit service. The shortage of parking could then effectively encourage an increasing share of employees and visitors to use transit, vanpool, and carpool.

This study estimated two mode-share scenarios for each site, each representing high or low transit usage that could be reasonably expected. These scenarios are expressed in terms of estimated total round trips by transit. The analysis found that transit usage could vary greatly among sites, with some estimates as

Table ES-1: Summary of BRAC changes

Installation	Personnel and Employees			Parking			Housing		
	Present	2015	Growth	Present	2015	Growth	Present	2015	Growth
<b>Virginia</b>									
Army National Guard	1,300	2,500	92%	844	1,112	32%	0	0	None
BRAC 133 (Mark Center)	0	6,400	N/A	0	3,990	N/A	0	0	None
Engineer Proving Ground	50	8,500	16,900%	50	5,500	10,900%	0	0	None
Fort Belvoir	23,707	27,791	17%	27,000	Unknown	Unknown	2,070	2,070	None
<b>Maryland</b>									
Andrews Air Force Base	14,678	16,600	13%	3,147	Unknown	Unknown	1,300	887	-32%
Fort Meade	40,000	62,000	55%	Unknown	Unknown	Unknown	3,007	2,627	-13%
Naval Medical Center	8,000	10,500	31%	6,083	8,087	33%	711	1,216	71%
<b>Washington, D.C.</b>									
Bolling-Anacostia Annex	13,000	13,650	5%	6,987	6,987	None	1,040	1,090	5%

low as one percent and others as high as 45 percent.

## Transit Service and Facility Proposals

With an estimate of transit demand completed, the study progressed to developing transit service and customer facility proposals for each of the eight sites.

Transit service proposals were built on estimated demand and an understanding of existing and planned transit services. Proposals are a combination of new services, modifications of existing or planned services, and planned services without any modification. Some proposals were developed specifically for this study while others were based directly on recommendations from local and state transportation plans.

For all sites, TAC members provided insight and recommendations throughout the process, most notably during the development of these service proposals.

This report describes the proposed transit services in terms of local bus, express bus, or shuttle service. Furthermore, proposals are summarized by their intended



Figure ES-2: Richmond Highway Express

Source: Schmin Web Transit Center

purpose: either to improve direct local bus service or express service to a site, or to improve connections to nearby transit hubs. These service concepts reflect the notion that each proposed improvement is essential to offering a complete set of transit options at all sites. In all, this study proposes an increase of more than 228,000 annual vehicle revenue hours of new, modified, or planned local and express bus service throughout the region, as summarized in Table ES-2.

Additionally, this study verified existing customer facilities for all sites and defined, at a conceptual level, new facilities that would be appropriate to support these expanded transit services.

Customer facility needs were determined by identifying any existing stops and amenities near each site entrance that was recommended

to receive new or enhanced transit service, or where transit operations are expected to be modified to alleviate security concerns.

Because buses are restricted to operate within the perimeter of any DoD site, this study considered locations where transit centers would be needed due to potentially high transit demand. In some cases DoD is currently building transit centers (BRAC 133) or are actively planning future transit centers near main entrance points (Fort Belvoir and Engineer Proving Ground) with local jurisdictions in cooperation.

Several Metrorail stations would serve as primary transfer points for proposed services, though some of these stations are already facing bus bay shortages, especially during the peak periods. Metro has identified the number of additional bus bays that are needed for these stations, which will be critical in providing convenient transfers for BRAC employees and visitors.

The jurisdictions are concerned about bus bay capacity and congestion during peak travel periods at several of the Northern Virginia Metrorail stations. In particular, based on the service recommendations in the study, bus bay capacity and congestion may be of most concern at Ballston, Franconia-Springfield, King Street, Pentagon, and Van Dorn Street stations. In addition, Medical Center station in Bethesda, Maryland experiences bus bay congestion during peak periods. Bus bay expansions should be considered and constructed to accommodate the recommended increases in both bus and shuttle services proposed in this report. The USDOT TIGER grant funded additional bus bays at the Franconia-Springfield and Pentagon Metrorail stations.

Table ES-2: Key characteristics

Installation	Annual Vehicle Revenue Hours Increase required for Service Proposals	Potential Transit Passenger Round Trips per Day		Potential Transit Mode Share		
		Low	High	Low	High	
Virginia						
Army National Guard	10,954	280	520	11%	21%	
BRAC 133 (Mark Center)	17,272	830	1,670	13%	26%	
Engineer Proving Ground	28,584	740	1,510	9%	18%	
Fort Belvoir	41,406	1,390	2,780	5%	10%	
Maryland						
Andrews Air Force Base	27,178	420	830	2.5%	5%	
Fort Meade	90,134	460	2,850	1%	5%	
Naval Medical Center	13,335	3,150	4,730	30%	45%	
Washington, D.C.						
Bolling-Anacostia Annex	0	550	1,090	4%	8%	

## Costs

Order-of-magnitude cost estimates for the transit services defined in this study were developed to identify the services' financial implications. This study developed cost estimates for transit proposals that could feasibly be implemented by FY 2011 and no later than FY 2015. However, a majority of these proposals are not funded at this time.

Two types of costs were estimated: annual operating costs and one-time capital costs, which are shown in Tables ES-3 through ES-7. Cost estimates for proposed shuttle services were not estimated. All costs are in FY 2010 dollars.

### Operating Costs

Annual operating costs include labor, vehicle maintenance, fuel, insurance, and administration. Some vehicle costs are considered an operating cost when the operating agency pays a contractor to run its service, like MTA commuter buses, for example. In this situation, the cost of vehicles is annualized into overall operating costs.

Table ES-3: Estimated near-term operating costs by operating agency (FY 2010 \$)

Operating Agency	Net Operating Cost
Metrobus	\$5,607,070
Fairfax Connector	\$4,443,169
Central Maryland Regional Transit	\$3,275,043
Maryland Transit Administration*	\$1,299,714
TheBus	\$1,170,797
Alexandria DASH	\$371,157
Howard Transit	\$278,400
Ride On	\$120,169
Potomac and Rappahannock Transportation Commission	\$71,833
<b>Total</b>	<b>\$16,637,352</b>

\* Vehicles factored into MTA operating costs

Transit agencies provided operating costs in units of dollars per revenue-hour. These data, coupled with annual revenue-hours defined during service planning, provide a good estimate of annual operating costs for each proposed service. Using the average fare recovery ratio for these agencies, this study estimated passenger revenues and subtracted them from total operating costs to achieve an estimate of the *net* operating cost.

These annual net operating cost estimates are summarized in Table ES-3 by operating agency in descending order, and in Table ES-4 by DoD site and operating agency.

This study found that, if all proposed services are implemented, Metrobus would account for the largest share of net operating costs with about \$5.6 million. Fairfax Connector and Central Maryland Regional Transit would be second and third with about \$4.4 and \$3.3 million in annual net operating costs, respectively.

### Capital Costs

One-time capital costs account for additional vehicles and customer facilities and amenities. Vehicle costs apply when an operator purchases, rather than leases, vehicles.

An estimated 97 new vehicles would be required to meet the needs of the transit service proposals. This study assumed a uniform cost of \$560,000 per bus, the standard cost for a typical 42-foot bus. All required buses would total of more than \$50 million FY 2010 dollars. Vehicle costs by agency are reported in Table ES-5 and ES-6, with Metrobus, Fairfax Connector, and CMRT taking the top three spots, representing over 83 percent of all estimated vehicle costs.

Customer facilities and amenities costs were calculated using historical pricing data, and are summarized in Table ES-7. As with operating and vehicle costs, all customer facility costs are in FY2010 dollars. Customer facility cost estimates considered

Table ES-4: Detailed summary of estimated near-term operating costs by operating agency (FY 2010 \$)

Site	Operator	Cost
Army National Guard Readiness Center	Metrobus	\$1,028,867
BRAC 133 (Mark Center)	Metrobus	\$1,121,291
	DASH	\$371,157
Engineer Proving Ground	Metrobus	\$267,797
	Fairfax Connector	\$2,227,581
	PRTC	\$71,833
Fort Belvoir	Metrobus	\$1,579,945
	Fairfax Connector	\$2,215,588
Andrews Air Force Base	Metrobus	\$267,797
	TheBus	\$1,170,797
	MTA	\$259,943
Fort Meade	Metrobus	\$267,797
	CMRT	\$3,275,043
	Howard Transit	\$278,400
	MTA	\$1,039,771
National Naval Medical Center	Metrobus	\$1,073,576
	Ride On	\$120,169
Joint Base Anacostia-Bolling		\$0
<b>Total</b>		<b>\$16,637,352</b>



factors such as design, temporary facilities, project delivery, contractor profit, overhead allowance, and bonding. These factors, which are also shown in Table ES-7, provide a more complete picture of expected total cost to construct all proposed customer facilities and amenities.

Table ES-5: Vehicle costs by operator (FY 2010 \$)

Operating Agency	New Vehicles	Total Cost
Metrobus	29	\$16,240,000
Fairfax Connector	27	\$15,120,000
Central Maryland Regional Transit	20	\$11,200,000
TheBus	8	\$4,480,000
Maryland Transit Administration*	6	\$0
Howard Transit	3	\$1,680,000
DASH	2	\$1,120,000
Potomac and Rappahannock Transportation Commission	1	\$560,000
Ride On	1	\$560,000
<b>Total</b>	<b>97</b>	<b>\$50,960,000</b>

\* Vehicles factored into MTA operating costs

Table ES-6: Detailed summary of estimated vehicle costs (FY 2010 \$)

Site	New Vehicles	Operator	Cost
Army National Guard Readiness Center	4	Metrobus	\$2,240,000
BRAC 133 (Mark Center)	4	Metrobus	\$2,240,000
	2	DASH	\$1,120,000
Engineer Proving Ground	2	Metrobus	\$1,120,000
	10	Fairfax Connector	\$5,600,000
	1	PRTC	\$560,000
Fort Belvoir	7	Metrobus	\$3,920,000
	17	Fairfax Connector	\$9,520,000
Andrews Air Force Base	2	Metrobus	\$1,120,000
	8	TheBus	\$4,480,000
	2	MTA*	\$0
Fort Meade	2	Metrobus	\$1,120,000
	20	CMRT	\$11,200,000
	3	Howard Transit	\$1,680,000
	4	MTA*	\$0
National Naval Medical Center	8	Metrobus	\$4,480,000
	1	Ride On	\$560,000
Joint Base Anacostia-Bolling	0		\$0
<b>Total</b>	<b>97</b>		<b>\$50,960,000</b>

\*Does not include the four MTA vehicles required, as they are factored into MTA operating costs

Transit center costs were estimated using typical components (e.g. shelters, benches, signage, etc.). As such, these cost estimates should be considered an absolute minimum. Transit center costs would be higher if more complex designs (e.g. a small building) are desired by the funding jurisdictions.

Table ES-7: Estimated customer facility costs by site (FY 2010 \$)

Site	Total Cost
AAFB	\$171,303
Fort Belvoir	\$155,316
JBAB	\$112,889
EPG	\$97,878
ARNGRC	\$60,638
Fort Meade	\$57,438
<b>Subtotal</b>	<b>\$655,462</b>
Factors	
Design	30%
Temporary Facilities	25%
Project Delivery	35%
<b>Grand Total</b>	<b>\$1,437,920</b>

Costs for additional bus bays at Metrorail stations are not included in study cost estimates, as these improvements are often an inseparable part of large-scale station improvements, including expansion of bus circulation and pedestrian access. In all, this study estimates total customer facilities and amenities costs for all eight sites at more than \$1.4 million, though this number would likely be higher if more complex designs are used for transit centers.

## Funding

Funding to support new and expanded transit services could come from two sources—increasing the amounts provided through existing transit funding sources or obtaining funds from new sources. The former is a challenge, as these sources are already strained simply to support existing services.

### Existing Funding Sources

Because fare revenues are already built into this study's net operating cost estimates and advertising revenues have limited potential, state and local funds remain the primary operating funding sources. These funds are severely constrained, especially when the economy is weak and tax revenues are significantly reduced. Implementing this study's service proposals would likely require contributions at the state and/or local level.



Figure ES-3: Customer amenity (shelter and signage)

It would be difficult to implement this study's service proposals without funding sources that can be sustained, particularly given challenges in maintaining current levels of transit service with limited funds.

Present funds for transit capital investments come from federal funds, state and local funds, and other sources including private investments. A few federal transportation grants can be used for transit purposes and could be applied to the construction of passenger facilities (e.g. the Congestion Management and Air Quality grants); competition for federal dollars can be great. Private funds are generally used for transit investments where the resulting vehicles or facilities would create some benefit to the private entity.

#### *Future Funding Sources*

In consideration of the current funding constraints, new funding sources must be explored to allow local jurisdictions, states, and transit service provider to timely initiate the best-fit transit improvements to BRAC installations, especially those that can feasibly be done by September 2011.

New sources of funds could either be programs not specifically intended for transit purposes or those that are newly created. For example, the Defense Access Road (DAR) program typically provides funding for improvements to public roads when growth at a military facility would cause a significant increase in traffic congestion. DoD recently approved the use of DAR funds for a transit project at the National Naval Medical Center. With DoD approval, the use of DAR funds for other transit capital investments could also be possible.

Other types of federal grant programs have been created in response to the current economic situation. These programs are one-time efforts and

application opportunities have passed, but they illustrate the types of other funding programs that could be created in the future:

- The American Recovery and Reinvestment act of 2009 (ARRA) grants, including the Transportation Investments Generating Economic Revenue (TIGER) grants
- Specific appropriations; for example, the DoD Appropriations Act of 2010 included \$300 million for transportation improvements in support of National Naval Medical Center and Fort Belvoir medical facilities
- U.S. Department of Transportation's livability grants

#### **Implementation Strategy**

Decisions about new and enhanced transit services must be made collaboratively by the public agencies that fund transit services, the state and local agencies responsible for transportation system operations, and the Department of Defense.

Although there is a regional interest in ensuring the availability of adequate transit services at the sites affected by BRAC relocations, transit

service decisions must be made on a site-by-site basis. Each site has unique market and service characteristics, and different DoD agencies have responsibility for the various sites.

Agreement on funding is crucial to implementation of services, as these services would add to the cost of regional transit. The state and local governments, DoD, and transit operators must cooperate on service decisions, funding, and customer facilities to ensure that changes are compatible with current transit services and consistent with transit development plans. Finally, DoD and each BRAC installation can effectively participate in these decisions as they have the best and most-current information on the characteristics of relocated employees and the timing of relocation actions. DoD also controls access to the sites.

Transit service enhancements should be in place before major employee relocations occur so that employees have access to the services from the beginning of their tenure in their new locations. Early implementation of priority services would allow employees located at each site to take advantage of these services and allow the base to provide a market to support their commute needs.

To allow services to be implemented on schedule, more-detailed operations planning, including prioritization of service concepts, must begin now, and in fact it has for some sites. The implementation strategies should include identification of reliable funding sources, decisions on which service improvement alternatives to implement (especially those considered feasible by 2011), decisions on customer facility enhancements, and development of a transit marketing program to inform employees of existing and anticipated transit services, vanpool and carpool



Figure ES-4: ARRA grants are an example of one-time federal funding opportunities

incentives, and other demand management alternatives.

Transit service proposals and their estimated costs presented in this report are not final nor can they be considered recommendations by Metro. This high-level study and its results are the beginning of a process to identify and ultimately implement transit service improvements in response to regional BRAC changes; it serves as a starting point for local jurisdictions to conduct further, more-detailed service and implementation planning that fits within their unique needs and budgetary situations.

Further, most proposals within this report were intended to serve the immediate commuting needs of personnel and employees at or even before the BRAC September 15, 2011 deadline, unless otherwise noted. As such, this report does not prioritize proposals; that is a task only the local jurisdictions can complete. Proposals that could be implemented between this deadline and 2015 (the planning horizon of this study) include estimated costs, and those proposals that are estimated to be implemented after 2015 do not have cost estimates (see technical memo 4.4: *Cost Estimate and Implementation Strategy*). Costs for shuttle services were not estimated, as they would require more detailed planning by DoD.









# Introduction





# Introduction

## Background

In 2005, Congress passed the most recent Base Realignment and Closure (BRAC) law, outlining which Department of Defense (DoD) bases throughout the United States would be realigned, consolidated, or closed. This process will affect bases within the metropolitan Washington region by moving tens of thousands of military personnel and civilian employees to selected bases no

later than September 15, 2011. The shift in personnel and employees requires transportation infrastructure improvements and transportation planning to help accommodate significant commuting changes.

## Study Purpose and Methodology

The Washington Metropolitan Area Transit Authority (Metro) initiated this study to provide a comprehensive

analysis of the impacts and opportunities on regional transit due to BRAC changes, specifically at eight DoD sites throughout the metropolitan area. These eight sites, as shown in Figure 1, were selected because they will experience a net gain in personnel and employees. The sites include the Army National Guard Readiness Center, BRAC 133 (Mark Center), Engineer Proving Ground, and Fort Belvoir in Virginia;

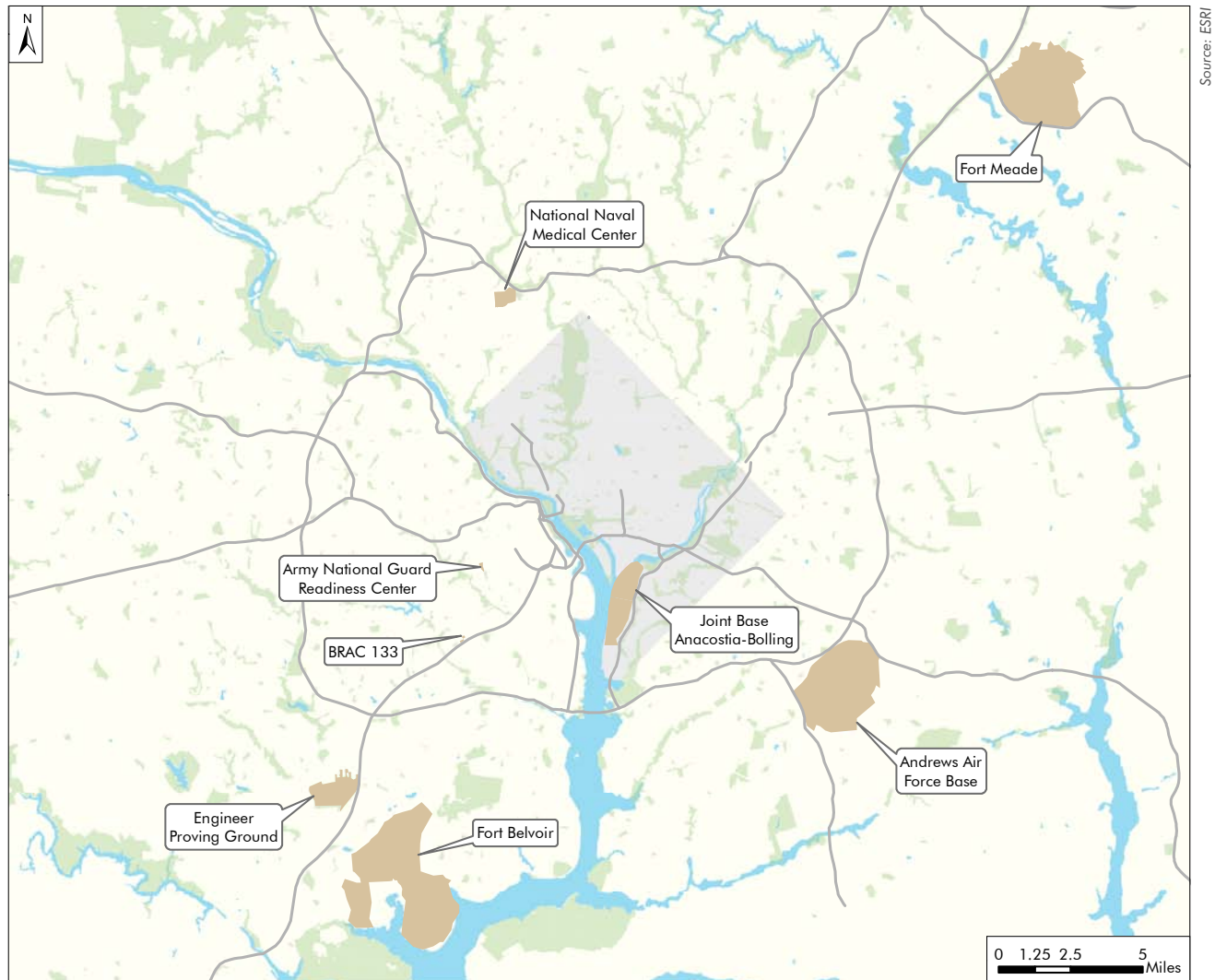


Figure 1: Study sites

Andrews Air Force Base, Fort Meade, and National Naval Medical Center in Maryland; and Joint Base Anacostia-Bolling in Washington, D.C.

The product of this study is a list of proposed transit service improvements in response to growth and estimated transit demand of each of the eight BRAC sites. Transit service proposals are site-specific and include bus services provided by Metro, regional transit providers (PRTC, MTA), and local jurisdictions. These service proposals were developed by estimating transit demand, identifying opportunities for modifications in existing transit services, and planning for future changes to regional transportation services and infrastructure.

Transit demand was estimated by researching and summarizing expected changes in personnel and employees, on-site housing, and availability of on- and off-site parking for each of the eight BRAC sites through 2015. This information was provided through previous on-base surveys and studies and through direct contact with various DoD offices.

This report concludes with a discussion of estimated operating and capital costs in FY2010 dollars, potential funding sources, and an implementation strategy. Data on average operating costs were provided directly from the transit agencies or found in the National Transit Database. Capital costs were derived from historical cost data.

Service proposals found in this report were developed solely in response to estimated transit demand at each of the eight BRAC sites. Therefore, this study represents unconstrained transit service needs throughout the region. The jurisdictions will decide

which priority service proposals to implement based on its policy, budgetary, and funding situation, as well as site-specific demand.

### **Stakeholder Outreach**

Given the complexity and time-sensitive nature of BRAC changes, this study was guided by a transportation action committee (TAC) composed of many jurisdictional representatives and other key stakeholders. The TAC provided comments, feedback, and continual support throughout the process.











# Virginia Sites

Army National Guard Readiness Center  
BRAC 133 (Mark Center)  
Engineer Proving Ground  
Fort Belvoir





# Army National Guard Readiness Center

## Arlington County, Virginia

Table 1: Key characteristics of ARNGRC

	Now	By 2015	Growth
Personnel	1,300	2,500	92%
Living Units	0	0	None
Parking	844	1,112	32%

### Background

The Army National Guard Readiness Center (ARNGRC) is a major National Guard post located in Arlington County, Virginia. The post lies at the southeast corner of the Arlington Boulevard and George Mason Drive intersection. Completed in 1992, the ARNGRC sits on a 15-acre plot of land adjacent to the historic Arlington Hall and is limited to a single 279,000-square-foot building. ARNGRC and Arlington Hall are distinct facilities and are separated by security fencing.

Currently, ARNGRC employs 1,300 people. Two separate parking decks totaling 656 spaces flank the ARNGRC to the north and south. Off-site parking provides an additional 166 spaces across George Mason Drive. In all, 822 spaces are available for employees, while 22 spaces are for visitors. No permanent or temporary housing is provided on site.

### Growth

ARNGRC will almost double to 2,500 total employees once BRAC construction is complete. Employee parking is expected to become more constrained. At present, the employee to employee parking ratio stands at 1.58. Once BRAC construction is complete, an additional 456 employee parking spaces will be available (for a total of 1,278), which, due to the growth in employees, will increase the ratio to 1.96 employees per employee parking space.

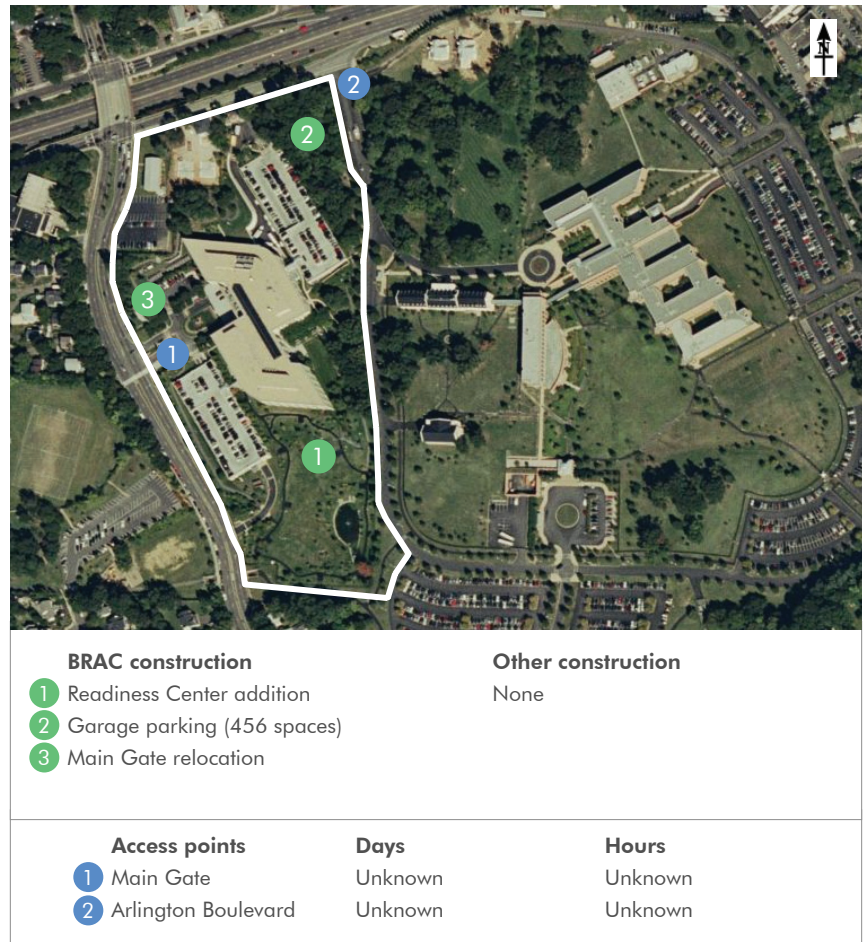


Figure 2: Access points and new and renovated facilities at ARNGRC

### Access

Access to the ARNGRC is and will remain limited. Two secure access points are located on the west and north sides of the site, each with a 100 percent ID check policy. The Main Gate is located along George Mason Drive, just south of the intersection with Arlington Boulevard's service roadways. Gate locations are shown in Figure 2. Hours of operation of each gate are unknown. BRAC construction will move the Main Gate 50 feet north of its current location to accommodate the building addition.

### Transportation Services

#### Existing

ARNGRC, adjacent to Arlington Boulevard and within two miles of I-66 and I-395, has good highway access due to its location in central Arlington County. The most recent traffic analysis found that intersections generally operate at acceptable levels. However, the intersections of George Mason Drive and Arlington Boulevard's service roadways are congested during peak periods. Commuters also have

difficulty exiting the Main Gate due to the lack of a traffic signal.

The ARNGRC area has a good coverage of transit service, including Metrorail, Metrobus, and Arlington Transit. Ballston-MU station on the Orange Line and Pentagon station on the Blue and Yellow Lines are the closest Metrorail stations to the Main Gate. These stations, as well as the Shirlington Transit Station, provide many transfer opportunities for local bus service. Both VRE lines, the Manassas and Fredericksburg, are accessible via the Crystal City Metrorail station, which is more than four miles from the Main Gate.

Metrobus route 22A is the only bus service directly to the Main Gate. Other bus routes, including Metrobus 4A, 4H, 10B, 23A, 23C, Columbia Pike lines, and Arlington Transit (ART) route 41 all stop within 0.75 miles of the Main Gate.

No shuttle buses currently serve the facility. However, DoD operates a shuttle to Arlington Hall, located adjacent to ARNGRC, with access through Ceremonial Drive. This 30-minute headway shuttle provides a connection from the Pentagon Transit Center to Arlington Hall, among other destinations, and not ARNGRC.

George Mason Drive includes sidewalks on both sides with a crosswalk for the Main Gate, though it is unsignalized. The *Arlington County Master Transportation Plan* denotes George Mason Drive and Arlington Boulevard as signed bicycle routes. However, neither roadways have bicycle lanes.

Existing transportation services are summarized in Figure 4 on the following page.



Figure 3: Ballston-MU Metrorail station

### Planned

Planned transportation services for ARNGRC can be found in the *Virginia Six-Year Improvement Plan*. Notable projects with relevance to ARNGRC include multimodal corridor improvements to Columbia Pike and spot improvements to I-66. Projects and studies beyond 2020 that may affect travel to and from ARNGRC are discussed further in the *Constrained Long-Range Transportation Plan*, prepared by TPB.

### Demand

The transportation management plan (TMP) for ARNGRC includes a goal for a 35 percent transit mode share by 2011, the completion date of all BRAC construction. This study estimates an 11 to 21 percent transit mode share by 2011, based on a review of existing transit mode share at both ARNGRC and Jefferson Plaza in Crystal City (the current location of the 1,200 employees to be relocated to ARNGRC), as well as an understanding of current and future parking availability. Table 2 summarizes this mode share range and what it means for total transit trips.

Table 2: Estimated transit trips for ARNGRC in 2011

Scenario	Transit Share	Personnel	Transit Round Trips
Low	11%	2,500	280
High	21%	2,500	520

This study estimates a transit mode share in 2011 lower than 35 percent due to the lack of a nearby Metrorail station and the future amount of available parking.

About seven percent of current ARNGRC employees commute via bus or rail, or a combination of the two, while 56 percent of Jefferson Plaza employees use transit. Most Jefferson Plaza employees use transit because their workplace is located within a short walking distance of the Crystal City Metrorail station, which cannot be said for ARNGRC where the closest Metrorail station (Ballston-MU) is 1.5 miles away. This is certainly a walkable distance, but not close enough to ARNGRC to grow transit ridership from seven to 35 percent.

Additionally, while parking will become more constrained once BRAC construction is complete, total on- and off-site parking at ARNGRC will remain high enough to ensure many employees will still drive alone, unless DoD implements an aggressive parking management program to encourage otherwise.

Beyond 2011, ARNGRC is not expected to undergo another period of significant expansion. Therefore, this study assumes transit mode share will remain consistent and within the estimated range.



Source: MWDOT, NAVTEQ, and ESRI

Figure 4: Existing transit service near ARNGRC



## Transit Service and Facility Proposals

ARNGRC is like other employment centers located in a semi-urban setting. Providing transit service directly to the site's access gates is desirable. Convenient pedestrian walkways and amenities around the site would also make transit more accessible. Because ARNGRC occupies a small site, there is no need for internal transit service.

According to a 2007 employee survey, employees at ARNGRC and Jefferson Plaza are primarily located in Virginia. Most of these residential locations, especially Fairfax County, Arlington, and Alexandria, are served by a transit via Metrorail and bus routes designed to feed into Metrorail stations. Suburban locations farther south in Virginia have access to commuter rail and bus services.

The site has a reasonable level of bus service, but only route 22A runs by the Main Gate. Several transit nodes are located in a four-mile radius of the site, though walking is not a convenient option at such distances. Consequently, providing reliable and frequent service to cover the last leg of the trip is the focus of transit

Table 3: Summary of ARNGRC service proposals

Purpose	Proposal
Direct local service	Increase weekday frequency for Metrobus route 22A
Connections to major transit centers	Allow ARNGRC employees access to existing State Department shuttle between Rosslyn and Arlington Hall  Implement shuttle connecting ARNGRC, Pentagon station, and Crystal City station via Washington and Arlington Boulevard

service proposals presented in this section. These connections can be provided through local bus service or site-specific shuttle buses, which are summarized in Table 3 and displayed in Figure 7.

### Local Bus Proposals

Metrobus route 22A is the only bus service to the Main Gate on George Mason Drive. This route operates between Ballston-MU and Pentagon Metrorail stations, and connects to the communities of Barcroft and Fairlington. Travel time between Ballston-MU station and ARNGRC is up to seven minutes, while travel time between Pentagon station and ARNGRC is about 28 minutes, despite the relatively short 4.3-mile distance.

This study proposes increasing the frequency of route 22A by reducing weekday peak headways to 10 minutes, weekday off-peak periods to 20 minutes, and Saturday and Sunday

headways to 30 minutes. Additionally, this study proposes adding Sunday service operating 15 hours per day at a 30-minute headway.

### Shuttle Proposals

ARNGRC has two shuttle opportunities: a shuttle to Rosslyn station and a shuttle to Pentagon and Crystal City stations.

The Department of State currently operates a shuttle between Rosslyn Metrorail station and Arlington Hall, a campus adjacent to ARNGRC that houses the National Foreign Affairs Training Center. This shuttle is only available to State Department employees, excluding shared use by National Guard employees. This study proposes that DoD and the State Department begin negotiations for shared use of this service. DoD would likely have to contribute operating funds if shared use is established.

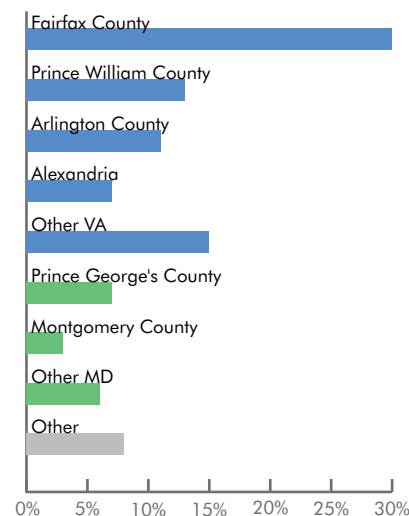


Figure 5: Residence of existing and incoming employees, 2007



Figure 6: Pentagon station bus facility

Source: Federal government

Transit Service Impacts of the BRAC Recommendations in the Metropolitan Washington Region



Source: MWCOC, Navteq, and ESRI

Figure 7: Proposed transit service near ARNGRC

Unlike the previous proposal, the second shuttle proposal would be an entirely new service. This study proposes shuttle service between ARNGRC and Pentagon and Crystal City stations via Washington and Arlington Boulevards. These stations are included because they are intermodal hubs providing connections to a variety of regional buses, Metrorail lines, and VRE commuter rail lines. This study suggests 10- to 15-minute peak headways and coordinated connections with VRE schedules, to the extent possible. It may be necessary to create a shuttle stop and turnaround area at ARNGRC to facilitate shuttle bus operations.

*Customer Facility Improvements*  
Improvements in customer facilities and amenities are needed in two locations, as summarized in Table 4. Recommended facility improvements are generally for boarding passengers only. In other words, customer facilities should be provided in situations where passengers may be expected to wait for service.

In lieu of the recommended DoD shuttle between ARNGRC, the Pentagon Transit Center, and the Crystal City VRE, the southbound George Mason Drive bus stop needs a shelter with a bench, trash bin, and information signage for passengers heading east towards Pentagon. If the recommended shuttle is implemented, most personnel heading in this direction would likely not use the 22A, thus not requiring further amenities over what exists today.

Unlike its eastbound side, westbound Arlington Boulevard at George Mason Drive is missing many bus stop amenities. This stop is recommended to mimic its eastbound counterpart by including a shelter with a bench, pedestrian pad, trash bin, information signage, and adequate lighting to

Table 4: Summary of proposed customer facility improvements at ARNGRC

Location	Improvements	Reason
George Mason Dr. @ Main Gate (southbound)	Shelter, bench, trash bin, info. signage	Passengers waiting for 22A. Would not need if Pentagon/Crystal City shuttle implemented
Arlington Blvd. @ George Mason Dr. (westbound)	Shelter, bench, pedestrian pad, trash bin, info. signage, adequate lighting	Passengers waiting for 4A, 4H



Figure 8: Current conditions at George Mason Drive at Main Gate (southbound) bus stop



Figure 9: Current conditions at Arlington Boulevard at George Mason Drive (westbound) bus stop

better serve boarding passengers who reside in Fairfax County and western Arlington County.



# BRAC 133 (Mark Center)

City of Alexandria, Virginia

Table 5: Key characteristics of BRAC 133

	Now	By 2015	Growth
Personnel	0	6,400	n/a
Living Units	0	0	None
Parking	0	3,990	n/a

## Background

The BRAC 133 project is being built in the Mark Center area of Alexandria, Virginia, west of the I-395 and Seminary Road interchange. BRAC 133 will result in consolidated administrative space for the Washington Headquarters Services (WHS), an organization within the Department of Defense (DoD). Originally intended for Fort Belvoir, DoD decided to consolidate WHS employees elsewhere to minimize effects on underdeveloped transportation infrastructure near the base. Figure 10 shows that parcels on which the headquarters are being built were previously unoccupied. Construction is under way.

Any congestion at the I-395 Shirley Highway/Seminary Road interchange will likely cause delay to transit service in the corridor serving the Mark Center and Southern Towers area. DoD and VDOT should work together to identify and fund ways to make transit the most efficient means of travel in the area to help make transit trips more attractive. This is especially important until physical improvements are made to accommodate bus, shuttle, and vehicular traffic from I-395 to Mark Center.

## Growth

The BRAC process will result in a realignment of 6,400 WHS employees from throughout the region to the

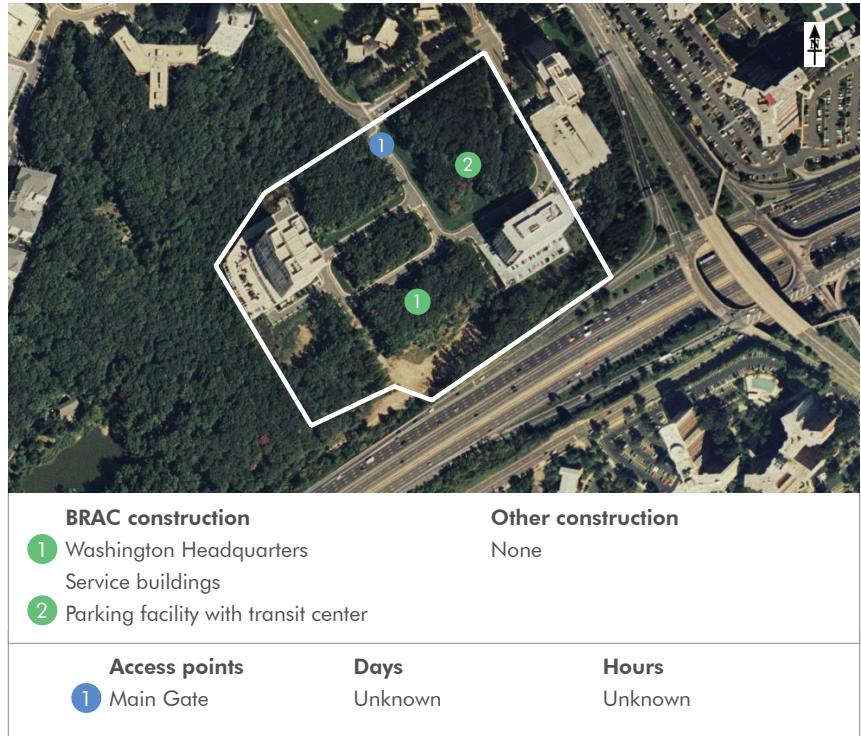


Figure 10: Access points and new and renovated facilities for BRAC 133

Mark Center. These employees will be consolidated into two buildings. The development will provide 3,840 total employee parking spaces in garage structures, per DoD regulations requiring 1.67 employees per space. The primary parking garage will include a transit center as well, which is detailed later in the discussion of transit facilities. The development does not include housing.

## Access

Once complete, access to the WHS buildings will likely be limited to one secure entry and exit point that will employ a 100 percent ID check policy. The general location of the access point can be found in Figure 10. Its schedule is presently unknown.

## Transportation Services

### Existing

BRAC 133 will be located adjacent to I-395 with immediate highway access via Seminary Road, also adjacent to the site. Subsequently, the site has excellent highway access, though I-395 and Seminary Road are currently congested. For example, the sections of I-395 and Seminary Road closest to the site are traveled by 173,000 and 50,000 vehicles per day on average, respectively.

The closest Metrorail station is Van Dorn Street station on the Blue Line (2.4 miles). King Street station (also a VRE commuter rail station), Pentagon station, and the Shirlington transit center are all relatively close as well, and each offer several connections to

nearby bus routes. About 16 park-and-ride lots are within a six-mile radius of the Mark Center, with the heaviest concentration near the I-395/I-495 intersection (the Mixing Bowl), many of which are free of charge.

Many bus routes operate along Seminary Road, but only one route, the Metrobus 7 line, in particular 7A and 7F, operates within the Mark Center site along Nottingham Drive. Other routes in the immediate area include Metrobus 7B, D, E, W, and X; 16L; 25B; 28A, F, and G; and Alexandria Transit DASH routes AT1 and 2.

The Institute of Defense Analysis offices, already located at Mark Center, currently operate a Pentagon shuttle with 15-minute headways from 7:20 a.m. to 6:20 p.m. Duke Realty, developers of the Mark Center site, also provides two shuttles, the Metro Express to the Pentagon City Metrorail station and Lunchtime Express to restaurants and retail in immediate Mark Center area. Metro Express operates during peak periods only with 15-minute headways, while Lunchtime Express only runs for several hours during midday with 10-minute headways.

The Mark Center area is relatively dense but is still auto-centric. Sidewalks, when available, are generally narrow and inconsistently placed, sometimes requiring pedestrians to cross where sidewalks abruptly end. Existing transportation services are summarized in Figure 13 on the following page.

#### Planned

Planned transportation services for BRAC 133 can be found in the *Virginia Six-Year Improvement Plan*. Notable projects with direct relevance to BRAC 133 include a potential direct HOV access ramp from I-395, additional DASH bus purchases, and

other city-wide improvements such as ITS implementation and traffic light synchronization. Projects and studies beyond 2020 that may affect travel to and from BRAC 133 are discussed further in the *Constrained Long-Range Transportation Plan*, which is prepared by the Transportation Planning Board.

#### Demand

An official transit mode share goal for this site has not been defined, though the BRAC 133 EA uses a transit mode share of 20 percent in calculating total work trips. However, 30 percent of incoming employees currently take public transit to work, likely because many of these employees work in Crystal City and other locations well served by transit.

This study estimates a 13 to 26 percent transit mode share range by 2011, based on an understanding of proximity to transit and carpool facilities, residence of incoming personnel, and future parking availability. Table 6 summarizes this range and what it means for total transit trips.

Beyond 2011, the WHS headquarters is not expected to undergo another period of significant expansion. The opening of a potential HOV off-ramp to Seminary Road, which is currently under review, may increase the carpool and vanpool usage, possibly at the expense of transit use. On the other hand, the new ramp could also create the possibility of express bus that could serve the site. In spite of these possibilities, this study assumes transit mode share will remain consistent and within the estimated range.

#### Transit Service and Facility Proposals

Figure 11 summarizes the current residential distribution of WHS employees awaiting reassignment to the Mark Center. The table reveals

that a majority of these employees currently reside in northern Virginia, particularly Fairfax County. Transit service proposals for BRAC 133 are tailored to reflect this distribution,

Table 6: Estimated transit trips for BRAC 133 in 2011

Scenario	Transit Share	Personnel	Transit Round Trips
Low	13%	6,400	830
High	26%	6,400	1,670

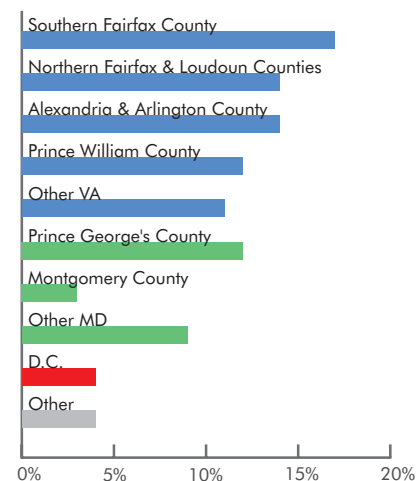


Figure 11: Residence of existing WHS employees, 2006



Figure 12: WHS buildings under construction

Source: flickr/Belvoir Army Engineers



Transit Service Impacts of the BRAC Recommendations in the Metropolitan Washington Region

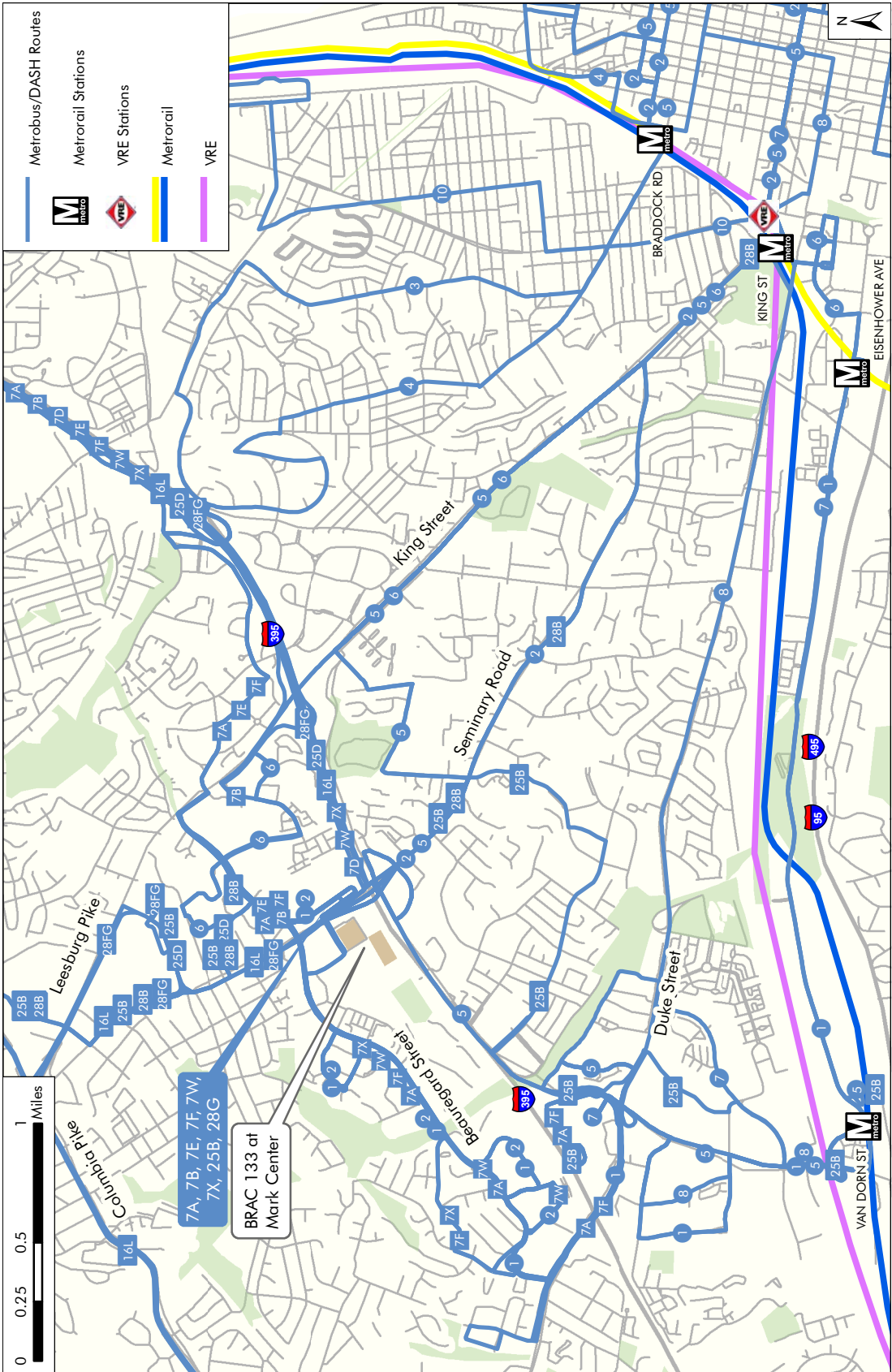


Figure 13: Existing transit service near BRAC 133

with an understanding that as time passes employees will likely further consolidate into northern Fairfax County much in the same pattern as employees already working in the Mark Center area.

The WHS buildings are being built in a semi-urban setting, where providing transit service directly to the Main Gate is desirable and feasible. Its relatively compact footprint in Mark Center eliminates the need for any internal circulation, thus transit service proposals will focus on transporting employees from nearby transit hubs and modifying and creating regional and local bus routes. All service proposals are summarized in Table 7 and displayed in Figure 15.

#### Local Bus Proposals

Several Metrobus and Alexandria Transit (DASH) bus routes operate in and around the Mark Center area and offer a significant opportunity for greater and more frequent connections to the planned WHS transit center, located within the north parking garage along Nottingham Drive and adjacent to the main entry and exit point.

This study proposes the modification of Metrobus routes 7 (B, D, and E), 28F, and 25 (A, B, and D), as well as DASH routes AT1 and AT2 to serve the planned WHS transit center. These routes already serve a variety of Mark Center locations and should be extended or modified to serve the upcoming transit center. In many cases, route modifications involve adding a WHS transit center stop for routes that already serve Southern Towers, one of Alexandria's highest ridership locations.

This study also proposes strengthening connections to nearby Metrorail stations (Pentagon, King Street, and Orange Line stations) through increased frequency.

Table 7: Summary of BRAC 133 service proposals

Purpose	Proposal
Direct local service	Reroute Metrobus bus routes 7 (B, D, and E), 28F, 25 (A, B, and D) Reroute DASH routes AT1 and AT2 Implement circulator service to WHS transit center via Seminary Road and Beauregard Street Reroute planned cross-town DASH service between Landmark Mall and Potomac Yard Shopping Center to serve WHS transit center
Direct express service	Implement new Omniride route that would serve Seminary Road from Lake Ridge in the long term Implement express route between Franconia-Springfield and Pentagon Metrorail stations via Beauregard Street
Connections to major transit centers	Improve connection to Pentagon with Metrobus 7D and 25D Improve connection to Orange Line stations with Metrobus 25B Improve connection to King Street VRE and Metrorail station with DASH AT2 Improve connection to Braddock Road Metrorail station with a DASH AT2 variant Implement shuttle service connection to a major transit center



Figure 14: DASH route AT2

Metro should increase frequencies of Metrobus route 7 (B, D, and E) and 25D. In particular, the frequency of route 7D, an express route to Pentagon Metrorail station in the reverse commute direction, can be increased by converting deadhead trips from routes 7B, D, and E into revenue trips. Afternoon peak-period frequency should be increased for route 25D towards Pentagon Metrorail station, provided it stops at the WHS transit center.

WHS employees would benefit from better regional connectivity by increasing the frequency of Metrobus route 25B in addition to DASH route AT2. These routes stop at several

Metrorail stations in northern Virginia and should be routed to directly serve the WHS transit center.

Route 25B operates between Van Dorn Street and Ballston-MU stations. This study proposes adding a variant to route 25B with three morning and afternoon peak trips offering limited-stop service.

The headway of DASH route AT2, which operates between King Street station and Southern Towers, should be reduced to 20 minutes. Alexandria Transit should also implement limited-stop service on some peak-period trips to better coordinate with VRE commuter trains. Route AT2 will

Source: Schumin Web Transit Center

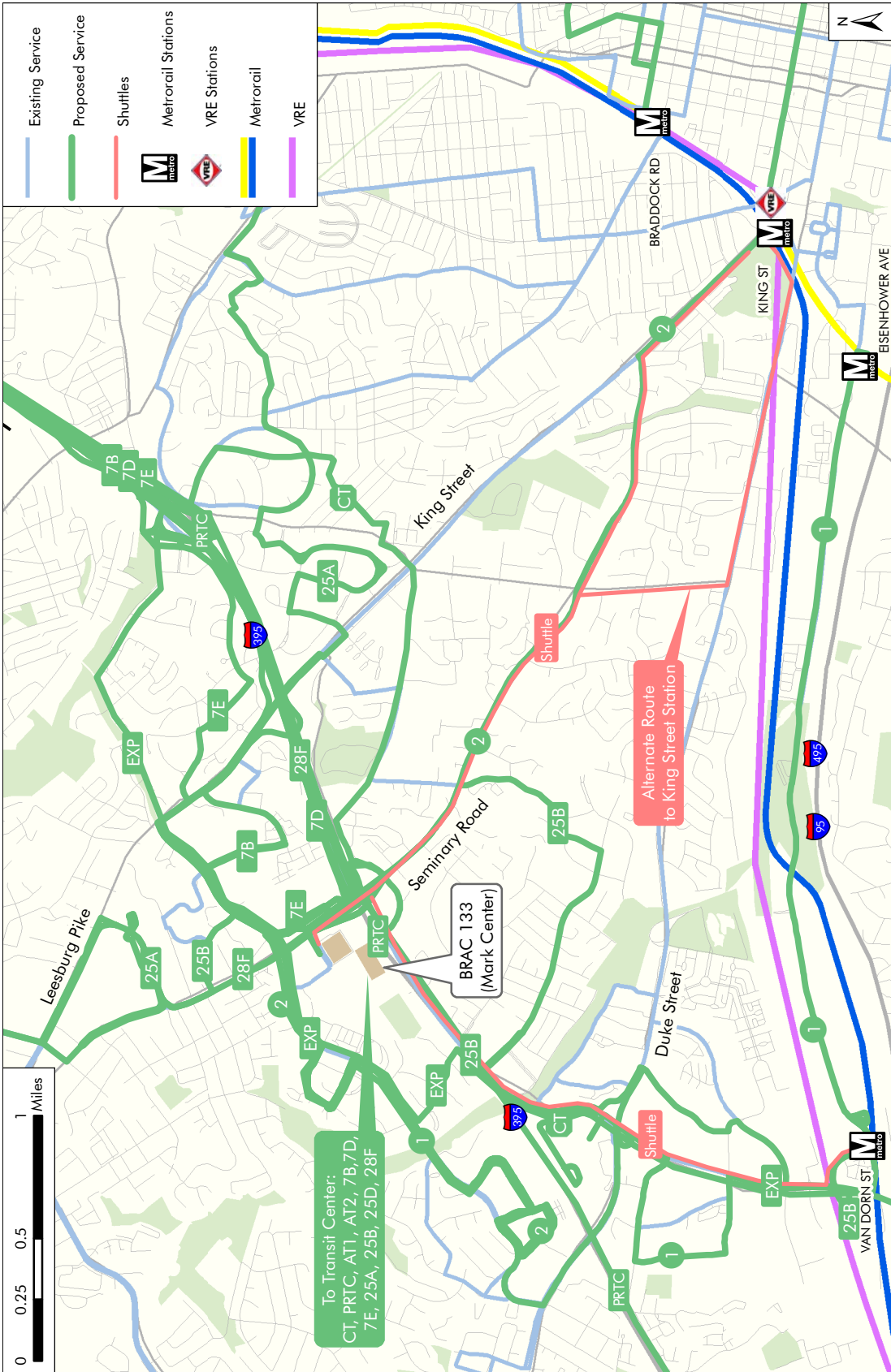


Figure 15: Existing transit service near BRAC 133

Source: MWD, Navteq, and ESRI



provide an essential connection to the planned Potomac Yard transit corridor via the Braddock Road Metrorail station. This connection may be time consuming, though, as AT2 also connects to King Street station before serving the Mark Center area. This study proposes a quicker route via West Braddock Road and King Street to provide a more efficient connection.

In a memorandum regarding FY2009 supplemental budget requests, Alexandria proposed a cross-town route from Landmark Mall to Potomac Yard Shopping Center. The city could consider serving Mark Center on this proposed route or on a separate cross-town connection. This would offer better connectivity within the city and possibly attract transit ridership.

Finally, this study proposes a circulator service to serve Southern Towers, the WHS transit center, Northern Virginia Community College (Alexandria campus), Skyline City, and Bailey's Crossroads along Seminary Road and Beauregard Street. A circulator would complement local and express bus service in the area.

#### Express Bus Proposals

During the I-95/I-395 Transit/TDM Study, the Potomac and Rappahannock Transit Commission (PRTC) proposed a new Omniride route between Lake Ridge and Seminary Road that serves the Mark Center area. This route would require an additional eight revenue hours of service per day with headways of 45 minutes, equaling four trips per peak period. This service would be contingent on constructing direct HOV access. If funded, this route could stop at the planned WHS transportation center. The target date for this service is 2020, but no funding has been identified.

Table 8: Summary of planned customer facility improvements at BRAC 133

Location	Improvements	Reason
Parking structure @ Nottingham Drive	Transit center (climate-controlled interior waiting area, large canopy, seating, and five saw-toothed bus bays)	To serve existing and proposed bus routes



Figure 16: Rendering of planned garage and transit center along Nottingham Drive

The I-95/I-395 Transit/TDM Study also proposed express Metrobus service along Kingstown-Van Dorn-Shirlington via Beauregard Street that continues to Pentagon via HOV lanes. This would operate on one of the three dedicated transit corridors proposed in the City of Alexandria Master Plan with 20-minute peak and 30-minute off-peak headways. This study proposes the extension of this express service to Franconia-Springfield Metrorail station in order to take advantage of intermodal connections and parking.

#### Shuttle Proposals

Neither the Duke Realty (WHS building developer) Mark Center employee shuttle nor the Institute for Defense Analyses employee shuttle will offer service to WHS employees. However, the BRAC 133 environmental assessment indicates that DoD will operate a shuttle to a Metrorail/VRE station east of the site.

While there are several intermodal hubs east of the Mark Center that could provide many transit connections, this study proposes the use of either King Street or Van Dorn Street Metrorail stations. King Street



Figure 17: Location of transit center presently serving as construction staging area

station would be advantageous due to its VRE connection, but Van Dorn Street station would provide DoD with a less congested shuttle route.

#### Customer Facility Improvements

As part of the WHS development, Duke Realty is building a large transit center on the north end of the parking structure shown in Figure 16, eliminating the need to upgrade the existing Nottingham Drive bus stops specifically for the BRAC process.

The transit center will include a climate-controlled interior waiting area, large canopy, ample seating, compliance with the Americans with Disabilities Act, and five saw-tooth bus bays. Additionally, the city has asked DoD and Duke Realty to include real-time bus information, a commuter store or kiosk, and an area for maps and route information.

Additional bus stops will be built, if needed, on the opposite side of Nottingham Drive from the transit center. These plans are currently in the approval process by Alexandria.



# Engineer Proving Ground

Fairfax County, Virginia

Table 9: Key characteristics at EPG

	Now	By 2015	Growth
Personnel	< 50	8,500	16,900%
Living Units	0	0	None
Parking	< 50	5,500	10,900%

## Background

Engineer Proving Ground (EPG) is located within Fairfax County near Springfield, Virginia, approximately 13 miles southwest of Washington, D.C. The site is bounded by Franconia Springfield Parkway, I-95, Fullerton Road, and Rolling Road. EPG is considered part of Fort Belvoir and not a separate base, despite a distance of several miles between the two. Originally used by the military as a land mine deployment and detection test facility from the 1940s and on, the 820-acre site is now largely abandoned, except for a few small facilities and minimal personnel.

Existing facilities at EPG are located in the northeastern corner. Before BRAC construction the site was occupied by fewer than 50 personnel. The site does not include any living quarters and had about 50 parking spaces.

## Growth

EPG will balloon from 50 to 8,500 personnel after the completion of the National Geospatial-Intelligence Agency's (NGA) headquarters. The new influx of thousands of employees every day requires construction of several new roadways within and through the site, most notably the extension of the Fairfax County Parkway along the western perimeter. DoD will construct approximately 5,500 parking spaces, of which 5,100 will be for employees. No housing will be provided.



Figure 18: Access points and new and renovated facilities at EPG

## Access

Access to EPG will be limited. Four potential secure access points will be located on the west and south sides of the site, each with a 100 percent ID check policy. The location of the gates are found in Figure 18, but the hours of operation of each gate is unknown.

The Main Gate will be accessed from the Fairfax County Parkway extension. The Barta Road entrance

will be upgrade from its existing condition. The status of the southbound and HOV I-95 access is unknown. Construction costs for these entrances, particularly for HOV access, may be prohibitive.

## Transportation Services

### Existing

Highway access is and will remain above average as EPG is located

between I-95 and Franconia Springfield Parkway, and will also border the future Fairfax County Parkway extension. BRAC relocations in this area, which also includes Fort Belvoir a few miles to the south, will increase traffic volumes on all major routes in the area, particularly I-95 and Fairfax County Parkway. These roadways are already at or nearing capacity.

The closest Metrorail station is Franconia-Springfield, which is several miles to the northeast. It is also the closet commuter rail station, serving VRE's Fredericksburg Line. Several dozen park and ride lots are found within Fairfax County, with particularly large concentration near Springfield and west Fairfax County.

No Metrobus route provides service near EPG, but several Fairfax Connector routes operate nearby, including routes 304, 205, 331, and 332. Pedestrian and bicyclist amenities are almost completely non-existent. Existing transportation services are shown in Figure 21.

### Planned

Planned transportation services for EPG can be found in the *Virginia Six-Year Improvement Plan*. Notable projects with relevance to EPG include the Fairfax County Parkway Extension, improvements to I-95, and a Saratoga park-and-ride facility. The Fairfax County Parkway extension will be constructed in four phases, with DoD providing some of the funding. Currently, only phases I and II are funded and will be completed this year.

Projects and studies beyond 2020 that may affect travel to and from EPG are discussed further in the *Constrained Long-Range Transportation Plan*, prepared by TPB.



Figure 19: Fairfax County Parkway extension

### Demand

Though a specific TDM goal for EPG is unknown at the time of this study, the Fort Belvoir final environmental impact statement (FEIS) developed preliminary concept service plans that assume both a five and 10 percent transit mode share. EPG is a smaller site and is more closely located to major transit hubs and services compared to Fort Belvoir, so it will likely see higher transit usage.

This study estimates a nine to 18 percent transit mode share range by September 2011. This estimate is based on an understanding of mode share at Fort Belvoir, which would be comparable to EPG, and the site's proximity to transit and carpool facilities, future parking availability, major planned and proposed infrastructure improvements, and planned transportation management strategies, including shuttle service. Table 10 summarizes this range and what it means for total transit trips.

Table 10: Estimated transit trips for EPG in 2011

Scenario	Transit Share	Personnel	Transit Round Trips
Low	9%	8,500	740
High	18%	8,500	1,510

Beyond 2011, EPG is not expected to undergo another period of significant expansion, though the potential construction of a network of HOT lanes, combined with new express bus service, could improve transit service to EPG. In spite of these possibilities, this study assumes transit mode share will remain consistent and within the estimated range.

### Transit Service and Facility Proposals

Figure 20 summarizes the current residential distribution of NGA employees awaiting reassignment to the EPG. Most employees currently live in northern Virginia, particularly Fairfax and Loudoun Counties. A significant minority of employees live in Maryland. Transit service proposals for EPG are tailored to reflect this distribution, with an understanding that employees will likely further consolidate into northern Virginia as time passes.

The NGA is reviewing options that may allow public transit buses to enter the outer perimeter of the EPG site. Buses would serve a proposed bus berthing area along the inner perimeter surrounding the visitor parking area, bringing transit riders

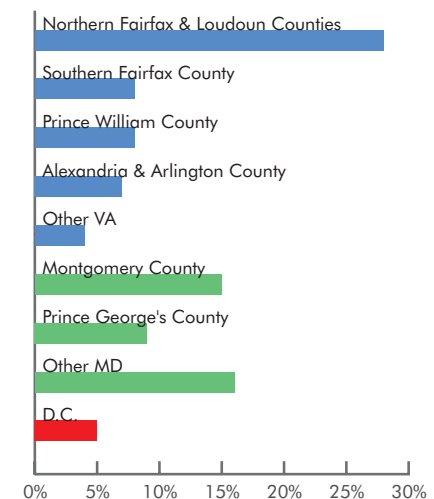


Figure 20: Residence of existing NGA employees

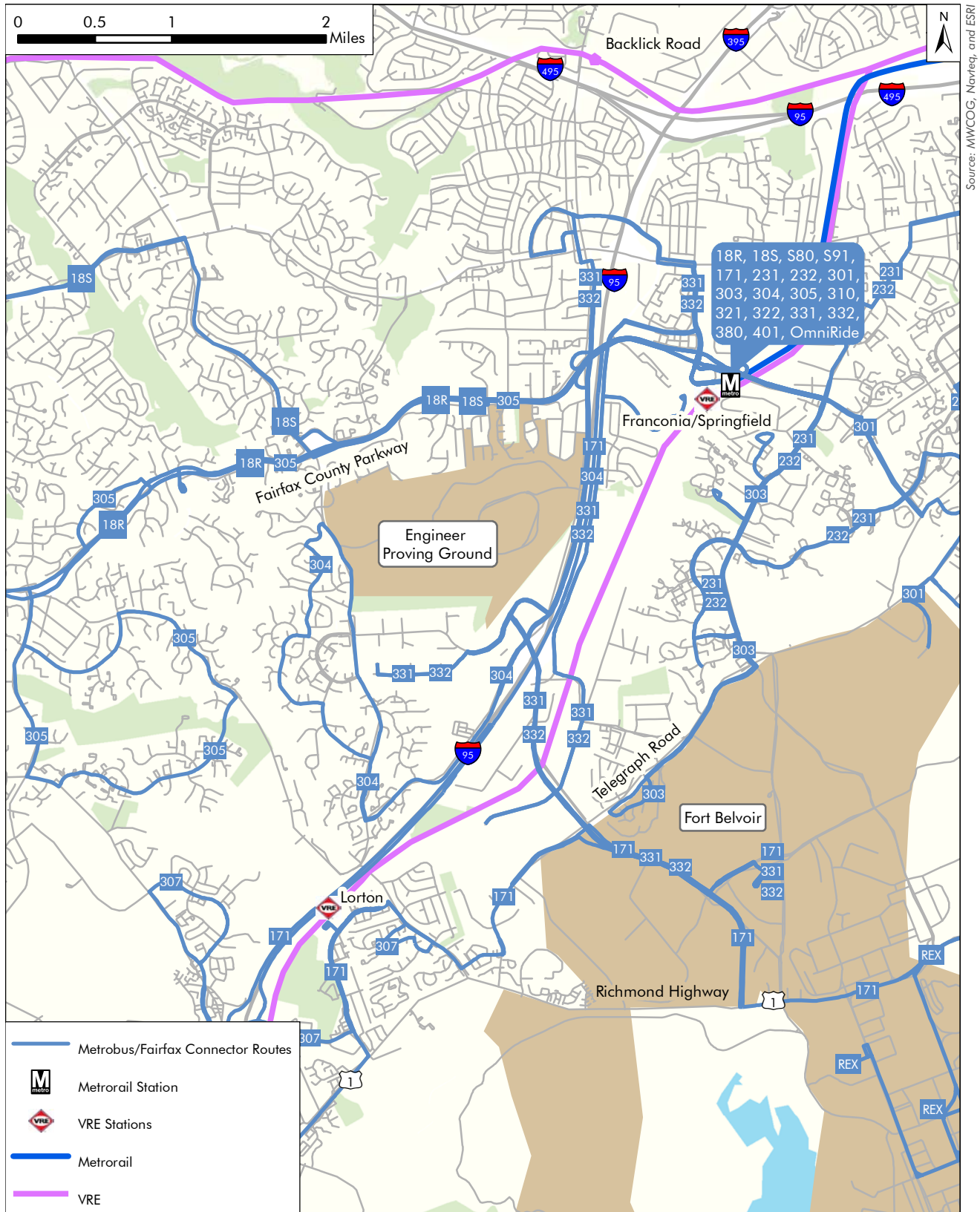


Figure 21: Existing transit service near EPG



within walking distance of the main building.

Many of the proposals for EPG were developed for the Fairfax County Department of Transportation's (FCDOT) Transit Development Plan (TDP). EPG-related service enhancements recommended in the TDP are primarily routing modifications to local and regional bus services. These modifications would improve connections to the new NGA campus from the local neighborhoods as well as from the Franconia-Springfield Metrorail and Lorton VRE stations. All service proposals are summarized in Table 11 and displayed in Figure 23.

FCDOT envisions enhancing the bus loading area at the Lorton VRE station to provide space for more routes and amenities. This upgraded transit center would support several local transit routes that would provide connections to both EPG and to sites within the Fort Belvoir military reservation. In addition, the I-95 HOT lane project was planned to incorporate an in-line bus stop on the west side of Lorton station and its tracks, including a pedestrian overpass over the tracks, but it is likely that this station will be dropped from the plan.

#### Local Bus Proposals

The TDP proposes that Fairfax Connector (FC) routes 331 and 332 be restructured due to roadway changes resulting from the extension of Fairfax County Parkway. This new route, named route 333, would serve the communities west of I-95. The proposed route 333 would operate between Franconia-Springfield Metrorail station and the Fullerton and Virginia I-95 industrial parks via the new NGA east campus. Morning service would operate in the counter-clockwise direction, with the afternoon service operating clockwise.

Table 11: Summary of EPG service proposals

Purpose	Proposal
Direct local service	Implement new Fairfax Connector route 333
Direct express service	Implement express service to and from Tysons Corner via I-495
	Implement cross-county express service to and from Herndon via Fairfax County Parkway
	Modify PRTC Prince William Metro Direct route to include EPG stop
	Implement PRTC routes to/from Dale City and Woodbridge in the long term
Connections to major transit centers	Improve connection to Franconia-Springfield Metrorail station and/or Lorton VRE station with new Fairfax Connector routes 309, 333, and 371, and restructured route 304
	Encourage use of the PRTC Prince William Metro Direct route to Franconia-Springfield Metrorail station
	Improve connection to Lorton VRE station with new shuttle service

FCDOT proposes restructuring route 171 into two separate routes that would incorporate portions of the existing route 331/332 operating east of I-95. New route 171 would incorporate the route segments from the existing 331/332, while a new route 371 would operate between the Franconia-Springfield Metrorail station and the Mount Vernon Hospital via Backlick and Fullerton Roads west of I-95. Route 371 would include a stop at the EPG Barta Road gate as well as the Lorton VRE transit center.

The TDP proposes a new route 309. This route would operate between the Franconia-Springfield Metrorail station and the Lorton transit center via the Sydenstricker Park and Ride. Linking these two routes and creating route 309 provides residents of the high-growth Lorton and Laurel Hill

areas connecting service at the Lorton transit center. From there passengers would be able to reach the NGA Campus through new route 371 or the planned BRAC shuttle.

The restructured route 304 would originate at the Franconia-Springfield Metrorail station then proceed to the Lorton transit center via the Saratoga neighborhood. Saratoga could then transfer at Lorton to either EPG or Fort Belvoir.

#### Express Bus Proposals

This study proposes two new express routes serving EPG. The first would operate between Tysons Corner and Lorton, originating at the Sydenstricker park and ride lot. This route would use the I-495 HOT lanes, which are scheduled to be completed in 2013, and would include reverse peak service stopping within EPG.



Figure 22: I-495 HOT lanes under construction

Source: Virginia Department of Transportation

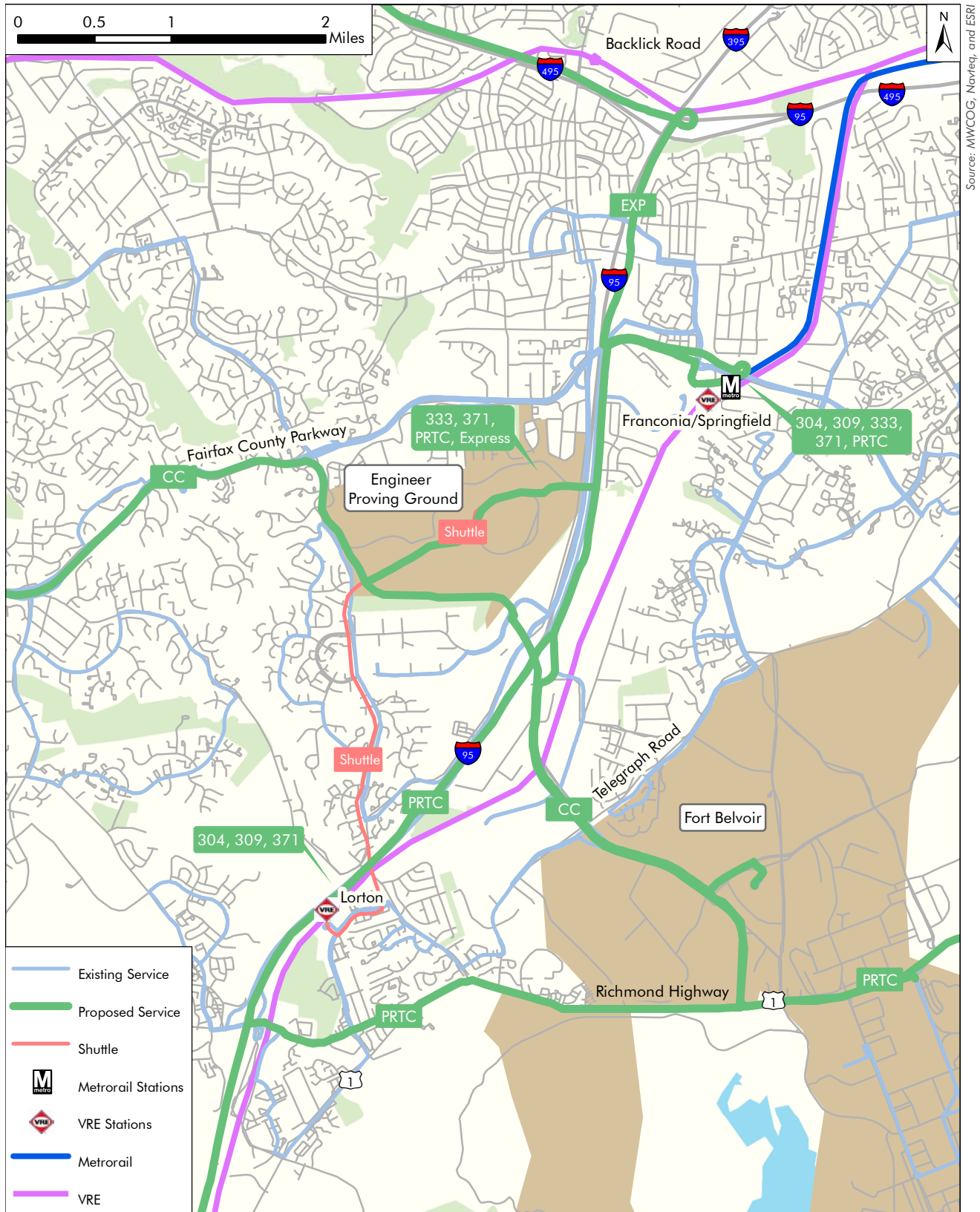


Figure 23: Proposed transit service near EPG

The other proposed route, cross-county express service from Herndon to Fort Belvoir, would follow the Fairfax County Parkway corridor and connect locations from the northern and western Fairfax County communities with BRAC sites in the southern portion of the county, including EPG. Implementation of this new service would not be expected until after 2020.

PRTC is considering extending its Prince William Metro Direct route (operating between Dale City/Woodbridge and the Franconia-Springfield station) to provide 30-minute frequency peak period circulation in Springfield in 2015, however, the plan is not funded. If ridership demand to the EPG is expected to be higher, PRTC would consider re-directing the extension to EPG.

PRTC originally proposed new express routes to serve EPG from the Dale City and Woodbridge park and ride lots as part of their long range plan, but these proposals were eventually removed. Though no funding has been identified, these proposals are still worth exploring as long-term possibilities.

Shuttle Proposals

The I-95/I-395 Transit/TDM Study suggests establishing shuttle routes with small buses to serve each of the two Fairfax County BRAC installations. The route to the NGA headquarters would follow Pohick and Rolling Roads to the NGA service road, terminating at the bus berths that will be constructed near the visitor parking lot. This route should be timed to meet VRE trains at the Lorton station, with train service currently operating during peak periods (with the exception of one midday trip). These services could be augmented in the future if the planned I-95 in-line bus stop at Lorton

Table 12: Summary of proposed customer facility improvements at EPG

Location	Improvements	Reason
Visitor parking lot @ North Loop Road	Transit center (three shelters and benches, large pedestrian pads, sidewalk, lighting, trash bins, information signage, LED Next Bus display, and two bus bays at minimum)	To serve proposed local, express, and shuttle routes to EPG
Franconia-Springfield Metrorail station	Further study to determine the feasibility and design of additional bus bays and passenger amenities	To support additional transit services that would utilize the station



Figure 24: Planned transit center will be located relatively closely to the NGA headquarters

station is built, though its construction now seems unlikely.

Customer Facility Improvements

Most routes are expected to use the Barta Road Gate to enter EPG, but buses coming from the west will use the new Fairfax County Parkway extension to enter at the Rolling Road Main Gate. The latter routing awaits approval because security may require passengers to board and alight from public buses closer to the Barta Road Gate, which is where visitors will enter to use the visitor parking. Whichever direction the buses may enter, if at all, they would stop at the planned bus berth area near the visitor parking lot just north of the main building.

Details of this area, like the number of bus bays, shelters, types of amenities, or whether if it will resemble a transit center at all, are presently unknown.

Given the estimated need at this location, Metro bus stop design guidelines require three shelters, sufficient sidewalk and pedestrian pad space, adequate lighting, information signage of maps and schedules, trash bins, and a Next Bus LED screen for real-time arrival information. Next Bus technology should still be implemented at this location for future use.

Additionally, while Franconia-Springfield Metrorail station currently has ample capacity for passenger circulation, bus bay utilization has reached capacity. Additional bus bays and passenger amenities are needed to support new and modified services to EPG. More detailed planning is needed to determine the feasibility and design of additional bus bays and passenger amenities.



# Fort Belvoir

Fairfax County, Virginia

Table 13: Key characteristics at Fort Belvoir

	Now	By 2015	Growth
Personnel	23,700	27,790	17%
Living Units	2,070	2,070	0%
Parking	27,000	Unknown	Unknown

## Background

Fort Belvoir is one of the largest military bases in the National Capital Region and contains almost 100 different organizations. The base was founded in 1917 during World War I and quadrupled in size over the next several decades. Historically, the base is known for training over 147,000 engineer troops during World War II.

The base is divided by Richmond Highway into two posts: South Post and North Post. The South Post is the largest and most developed of the two, and directly abuts the Potomac River. The North Post stretches as far north and west as Telegraph Road, less than a mile from I-95. The 7,780-acre base currently includes more than 23,700 personnel, 2,070 family housing units (excluding barracks), and reportedly as many as 27,000 parking spaces. Many of these spaces are reserved for other uses and are not utilized daily.

## Growth

BRAC realignments will result in a net gain of almost 4,100 personnel to Fort Belvoir's North and South Posts, though the South Post will receive almost all the new BRAC facilities, including the DeWitt Army Community Hospital. Total new parking is currently unavailable, though the base expects the hospital to include 3,500 new spaces for visitors, patients, and employees.

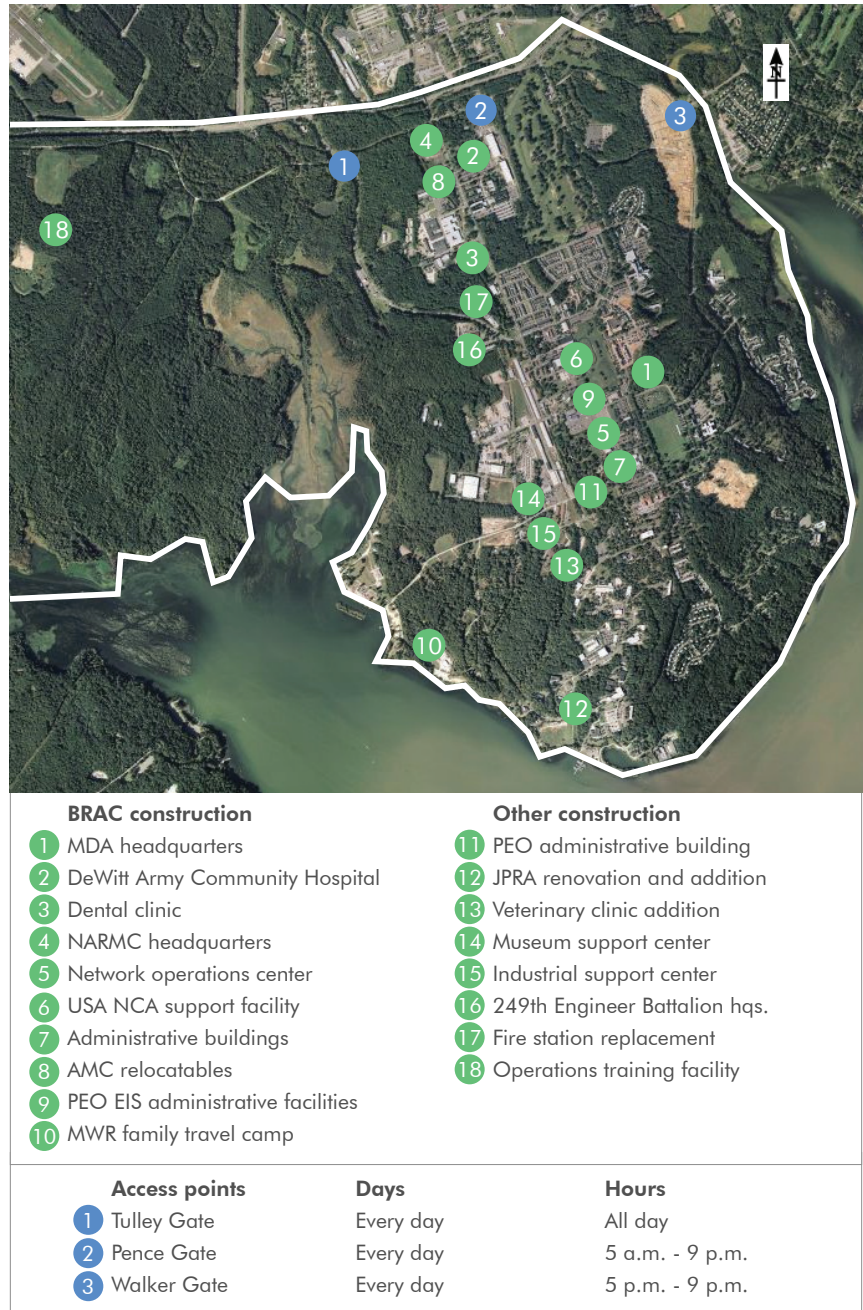


Figure 25: Access points and new and renovated facilities at Fort Belvoir's South Post

Many additional facilities will be constructed independent of BRAC actions. The most significant is the

Museum of the U.S. Army, which will likely be built in the west side of the North Post. The museum is expected

to receive 1,000,000 annual visitors, or roughly 4,000 daily visitors during peak season. Other significant new facilities not associated with BRAC include the Information Dominance Center, operations training facility, and the Post Exchange (PX) expansion. All of these facilities can be located in Figures 25 and 26.

Total family housing will remain at 2,070 units, but 1,700 will be rebuilt

as part of the housing privatization program. Reconstructed houses will be much larger, which officials estimate will contribute to an increase in Fort Belvoir's on-base population, perhaps reaching 8,000 people.

Access

Access to both posts at Fort Belvoir is and will remain limited. The base includes seven secure access points, each with a 100 percent ID check

policy. The location and hours of operation of each gate are revealed in Figures 25 and 26. Fort Belvoir is unique in that it is the only base in this study that allows public transit to operate on base. The Metrobus Richmond Highway Express (REX) currently operates between Alexandria and Fort Belvoir's South Post. The status of this route once BRAC actions have been completed is unknown. The REX, as well as other bus routes in the area, will be discussed in further detail in later sections.

Transportation Services

Existing

Fort Belvoir is located near I-95 and is accessible by two exits, one at Lorton Road and the other at Fairfax County Parkway. U.S. Route 1, otherwise known as Richmond Highway, bisects the site and provides additional highway access. The roadways near Fort Belvoir experiences heavy traffic volumes, particularly I-95 and Richmond Highway, and their ability to handle additional traffic is severely limited. Traffic is frequently congested at base entrances, including at Belvoir Road, Gunston Road, and Kingman Road.

The closest Metrorail station is Franconia-Springfield, which is several miles north of the North Post. Franconia-Springfield station and Lorton station are the closest commuter rail stations, both serving the VRE Fredericksburg Line. Several dozen park and ride lots are found nearby, with particularly large concentration near Springfield and Woodbridge along I-95 as well as western Fairfax County.

Nearby Metrobus service is limited to the REX and 11Y, though REX is the only route that enters the base. Several Fairfax Connector routes operate with stops along Fort Belvoir,



Figure 26: Access points and new and renovated facilities at Fort Belvoir's North Post





Figure 27: Fort Belvoir South Post

including routes 171, 301, 331, and 332. Other Fairfax Connector service in the immediate area includes routes 151, 152, 231, 232, 303, and 307. Additionally, Lee Coaches operates a bus from Fredericksburg to Fort Belvoir via I-95 HOV lanes, providing a single trip in the morning and one in the afternoon. A shuttle for hospital patients operates between the DeWitt Community Hospital on Fort Belvoir and the Walter Reed Medical Center in northern Washington.

On the base, pedestrian and bicycle facilities and amenities are limited.

Existing transportation services are summarized in Figure 29 on the following page.

### Planned

Planned transportation services for Fort Belvoir can be found in the *Virginia Six-Year Improvement Plan*. Notable projects with relevance to Fort Belvoir include the Fairfax County Parkway extension, improvements to I-95, and additional U.S. Route 1 crosswalks. DoD is considering shuttle service between Lorton station and Fort Belvoir to accommodate future growth, including BRAC-related changes. A commuter bus drop-off point from the I-95 HOV lane that would connect to

Lorton station and the potential Fort Belvoir shuttle (Shuttle 2 in Figure 31) is being investigated but is currently unlikely to be built.

Projects and studies beyond 2020 that may affect travel to and from EPG are discussed further in the *Constrained Long-Range Transportation Plan*, prepared by TPB.

### Demand

Fort Belvoir conducted an employee survey of transportation modes in September 2008. The survey found that four percent of employees take some form of transit, with a majority of these employees using commuter rail.

Though a specific transit mode share goal for Fort Belvoir is unknown, the Fort Belvoir FEIS developed preliminary concept service plans that assume both a five and 10 percent transit mode share. This study estimates a similar five to 10 percent transit mode share range by 2011, given the uncertainty of future availability of parking and travel demand management strategies. Table 14 summarizes this range and what it means for total transit trips.

Beyond 2011, Fort Belvoir is not expected to undergo another period

Table 14: Estimated transit trips for Fort Belvoir in 2011

Scenario	Transit Share	Personnel	Transit Round Trips
Low	5%	27,790	1,390
High	10%	27,790	2,780

of significant expansion. The potential construction of a network of HOT lanes, combined with new express bus routes, could improve transit service to Fort Belvoir. Over time, relocated personnel will likely move closer to Fort Belvoir, which might affect the attractiveness of transit. In spite of these possibilities, this study assumes transit mode share will remain consistent and within the estimated range.

### Transit Service and Facility Proposals

Figure 28 summarizes the residential distribution of Fort Belvoir employees. The figure shows that a majority of current personnel and employees reside in northern Virginia, particularly southern Fairfax County and Prince William County. Incoming personnel and employees also primarily live in northern Virginia, but are more evenly distributed among the inner Beltway

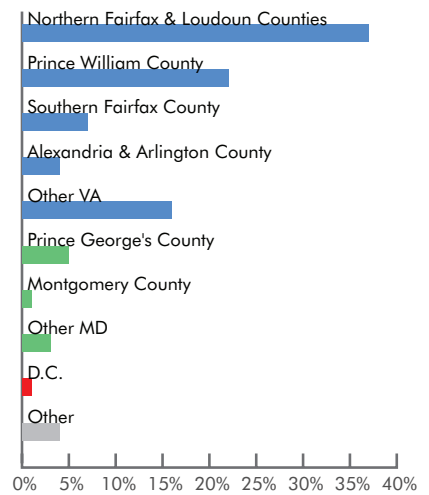
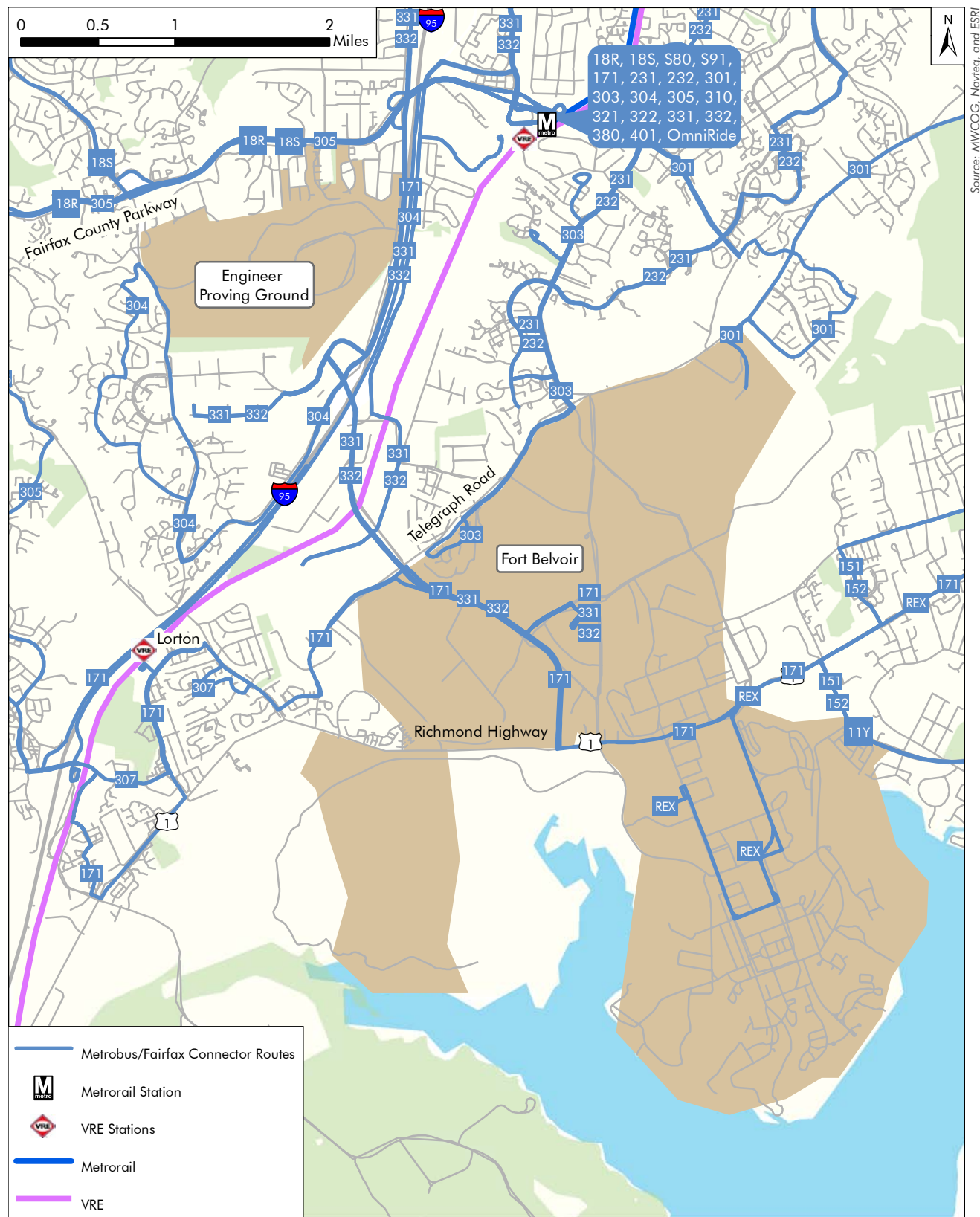


Figure 28: Residence of existing Fort Belvoir personnel and employees





Source: MWCOC, Navteq, and ESRI

Figure 29: Existing transit service near Fort Belvoir

counties and are more likely to live in Maryland. Fort Belvoir transit service proposals in this study are tailored to reflect these distributions, with an understanding that as time passes incoming personnel and employees will likely consolidate into southern Fairfax County and Prince William County.

Communities around Fort Belvoir will experience high growth over the next decade, at least in part due to the increased employment at the BRAC sites in southern Fairfax County. As a result, Fairfax County Connector and Metrobus services will likely experience increased demand. Service proposals of this study reflect this understanding, though much emphasis is given to providing connections to nearby major transportation hubs. All service proposals are summarized in Table 15 and displayed in Figure 31.

#### Local Bus Proposals

Like proposals for EPG, several Fort Belvoir proposals were developed as part of the FCDOT TDP. Some of the Fort Belvoir proposals are the same as EPG proposals due to their proximity.

FCDOT proposed restructuring route 171 into two separate routes. New route 171 would be of particular importance to Fort Belvoir, as it is planned to operate between the Franconia-Springfield and Huntington Metrorail stations along Richmond Highway. This route would stop at Pence Gate and continue to serve the Defense Logistics Agency parking lot. Additionally, the new route 371 would remain important to Fort Belvoir, similar to EPG, since it would provide a connection between Franconia-Springfield Metrorail station, Lorton station, and Pence Gate at Belvoir Road.

A new route 309 was previously discussed under EPG, too, but it is

Table 15: Summary of Fort Belvoir service proposals

Purpose	Proposal
Direct local service	Implement new Fairfax Connector route 333 Extend PRTC Jefferson Highway route to South Post
Direct express service	Implement express service to and from Tysons Corner via I-495 Implement express service to and from Vienna via I-66 and I-495 Implement cross-county express service to and from Herndon via Fairfax County Parkway
Connections to major transit centers	Improve connection to Lorton VRE station with Metrobus REX extension, new Fairfax Connector routes 309 and 371, and new shuttle service Improve connection to Franconia-Springfield station with modified Fairfax Connector route 171 and new routes 329 Encourage use of the PRTC Prince William Metro Direct route to Franconia-Springfield Metrorail station

worth mentioning in the context of Fort Belvoir. This proposed route would provide a connection for the Lorton and Laurel Hill communities to Lorton station. From there passengers would be able to reach Fort Belvoir by transferring to the proposed route 371, Metrobus REX, and the planned shuttle.

FCDOT also proposes a new route 329 to operate from Franconia-Springfield Metrorail station to Pence Gate via Telegraph Road and a planned extension of Mulligan Road. This proposed route provides the rapidly developing Kingstowne and Hayfield communities with expanded service to the Franconia-Springfield Metrorail station and a direct connection to Richmond Highway in the Fort Belvoir area.

PRTC has also proposed extending their Route 1 Jefferson Highway line beyond its current terminus at the Woodbridge VRE station to Fort Belvoir's South Post by no later than 2025. The service would be extended during the peak hours to provide trips at hourly headways.

#### Express Bus Proposals

The service proposals developed here incorporate suggestions from the Fairfax County TDP. The Metrobus Richmond Highway Express (REX) is a popular service that travels directly into Fort Belvoir's South Post, requiring security clearance at Pence Gate. Moving forward, the REX likely cannot continue to operate within Fort Belvoir once BRAC construction is completed. In response, Metro has proposed extending the REX along



Figure 30: Richmond Highway Express

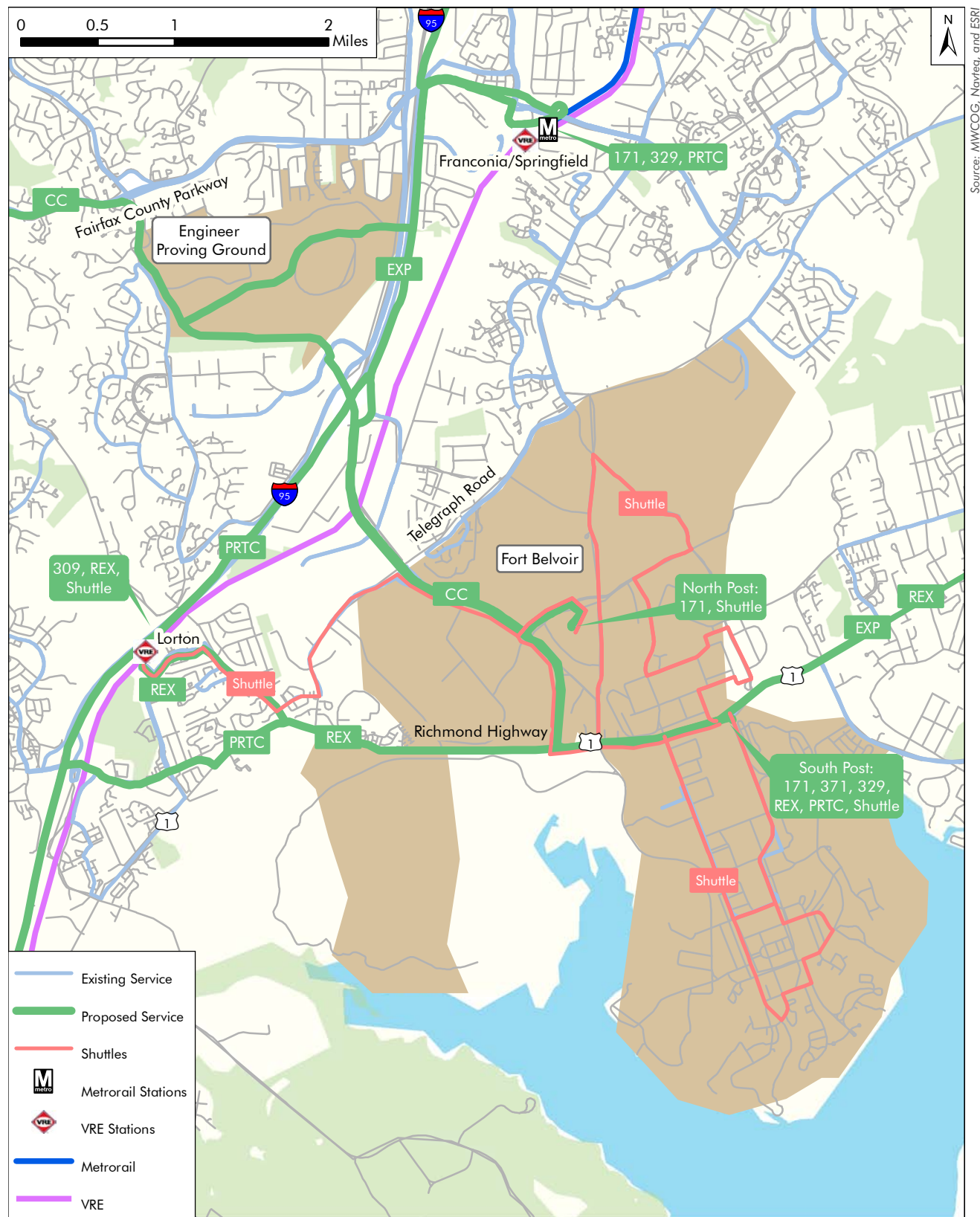


Figure 31: Proposed transit service near Fort Belvoir



Richmond Highway to the Lorton VRE station. The REX would still drop off and pick up passengers at Pence Gate, requiring some form of on-base shuttle service so that passengers may complete their journey.

This study proposes a new express route operating between Tysons Corner and Fort Belvoir with reverse peak service terminating at a proposed park and ride lot one mile east of Pence Gate. This new route would provide a connection to Fort Belvoir for residents of northern Fairfax County communities and would use the I-495 HOT lanes that are currently under construction and expected to be completed by 2013.

A new express route from Vienna to Fort Belvoir would provide quick and convenient access for residents of the western portion of Fairfax County. This express route would operate via I-66, I-495, and I-395, taking advantage of HOV lanes on I-66 and the HOT lanes on I-495. Note that this route will not be able to use the I-95 HOT lanes in the peak direction, as this facility will operate northbound only during the morning peak and southbound only during the evening peak.

A proposed cross-county express service from Herndon to Fort Belvoir would follow the Fairfax County Parkway corridor and would likely not be implemented until after 2020. this route would also serve EPG.

By 2011, Fort Belvoir employees would be able to make immediate use of PRTC's existing Prince William Metro Direct route, which serves the Franconia-Springfield Metrorail station from Dale City and Woodbridge. Employees could then connect to Fort Belvoir via local bus service.

Table 16: Summary of proposed customer facility improvements at Fort Belvoir

Location	Improvements	Reason
Belvoir Road @ Pence Gate	Transit center (three shelters and benches, large pedestrian pads, sidewalk, lighting, trash bins, information signage, LED Next Bus display, and two bus bays at minimum)	To serve proposed local, express, and shuttle routes to Fort Belvoir South Post, and to accommodate the modification of the REX route
Defense Logistics Agency parking lot	Enhanced bus stop (two shelters and benches, more lighting, trash bins, and information signage)	To serve proposed local and express routes to the Defense Intelligence Agency

### Shuttle Proposals

The I-95/I-395 Transit/TDM Study suggests DoD should establish shuttle routes to serve each of the two Fairfax County BRAC installations. The route to Fort Belvoir would stop at the Defense Logistics Agency building near Fairfax County Parkway then proceed to Pence Gate. This route should be timed to meet VRE trains at the Lorton station, with train service currently operating during peak periods (with the exception of one midday trip). These services could be augmented in the future if the planned I-95 in-line bus stop at Lorton station is constructed.

the exact number of bays would require more detailed operational planning.

More customer facilities are also needed near the Defense Logistics Agency building to accommodate passenger growth. The teardrop-shaped roadway in the parking lot already includes a 100-foot bus pull-in area, large eight-foot sidewalks, and lighting for the adjacent parking lots. Metro bus stop guidelines suggest this location should incorporate two shelters with benches, increased lighting, trash receptacles, and information signage including maps, routes, and Next Bus instructions.

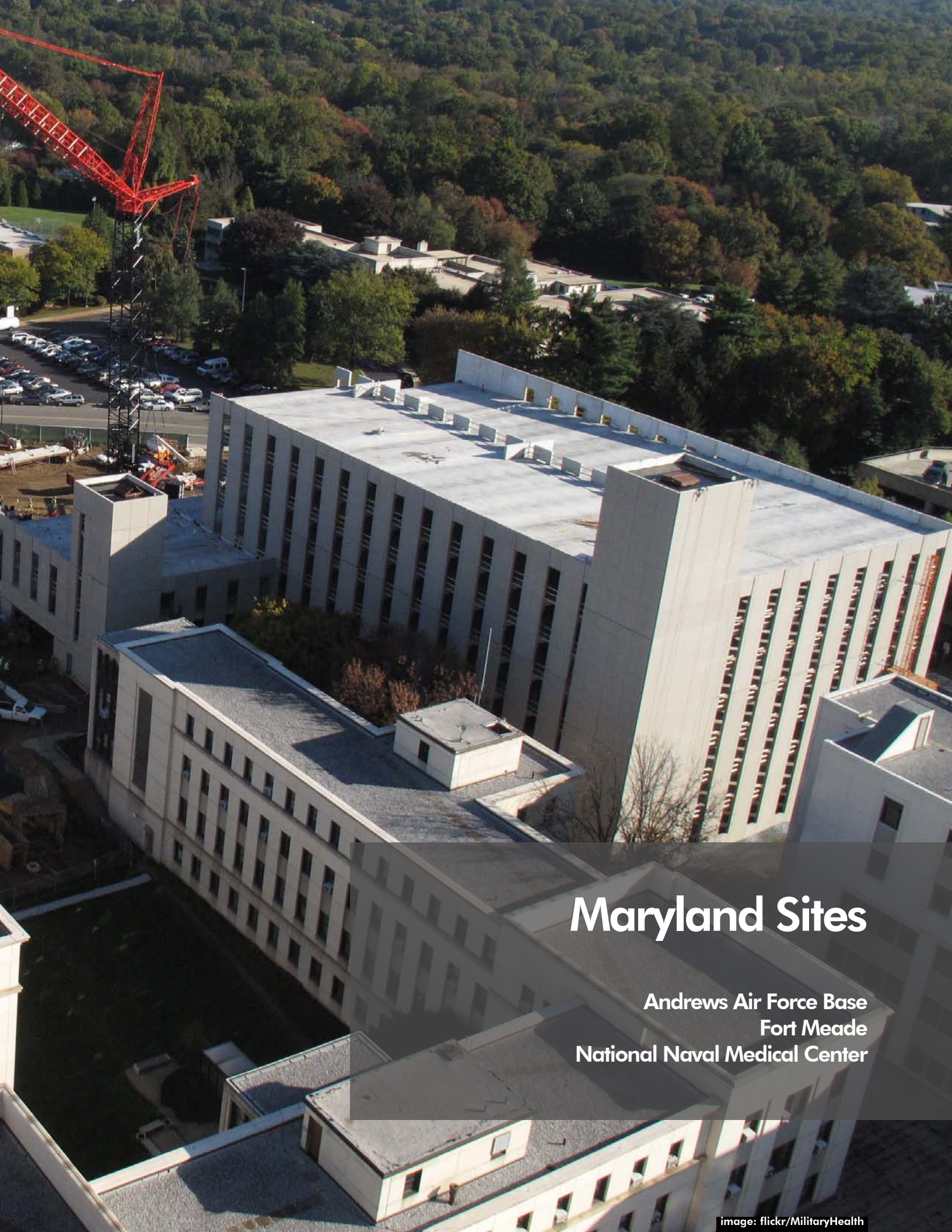
### Customer Facility Improvements

Fort Belvoir is currently constructing a transit center just outside Pence Gate to accommodate the modified REX route, which will no longer be able to operate within the South Post. The route will require passengers to exit at the new transfer area and board a DoD-operated internal shuttle to complete their journey. The newly constructed Pence Gate is being built with the transfer area in mind despite that funding for an internal shuttle has not been identified. Based on the number of proposed routes that may serve this transfer area and the number of potential boarding passengers, at least two bus bays and three shelters would be needed in addition to other amenities listed in Table 16, as prescribed by Metro bus stop design guidelines. Determining









# Maryland Sites

Andrews Air Force Base  
Fort Meade  
National Naval Medical Center





# Andrews Air Force Base

Prince George's County, Maryland

Table 17: Key characteristics at AAFB

	Now	By 2015	Growth
Personnel	14,678	16,600	13%
Living Units	1,300	887	-32%
Parking	3,147	Unknown	Unknown

## Background

Andrews Air Force Base (AAFB), located six miles southeast of Washington, D.C. in located Camp Springs, Maryland, was established in 1947 and most famously serves as the home for Air Force One. In addition to this responsibility, AAFB is operated and maintained by the 316th Wing, which acts as the host wing. The 4,346-acre base is divided by two runways and is bounded by I-495 to the north, Dower House Road to the east, and Branch Avenue and Allentown Road to the west. Presently, the base includes 14,678 personnel and provides housing with about 1,300 barracks and family housing units. Parking is limited to 3,147 total spaces throughout the base.

## Growth

All BRAC realignments will result in a net gain of approximately 800 personnel, a five percent increase. Displaced regional staff, representing most new personnel, will work on the west side of the base. Additional Air National Guard (ANG) personnel will work on the east side of the base once the ANG addition is completed. Growth in parking supply is currently unavailable.

AAFB will grow by a further 1,200 personnel due to non-BRAC construction, bringing total growth to 2,000 personnel. There will be no growth in on-base housing. Due to privatization of on-base family



Figure 32: Access points and new and renovated facilities at AAFB

housing, total housing units will drop by 32 percent over a three-year period.

## Access

Access to AAFB is and will remain limited. The base includes four access points with security gates, though a

potential fifth pedestrian gate was recommend in the TMP. Each access point employs a 100 percent ID check policy. The location and hours of operation of each gate are shown in Figure 32.

## Transportation Services

### Existing

AAFB directly borders I-95/I-495 (Beltway), Pennsylvania Avenue, and Branch Avenue, ensuring good highway access. The proximity of the Beltway and Washington, D.C. means that AAFB is in a high-traffic area, especially on its northwest side near the Main Gate. The average commute of AAFB personnel 45 to 60 minutes.

From the Main Gate, Branch Avenue station on the Green Line is the closest Metrorail station with a distance of roughly two miles. The base is not served by any nearby commuter rail stations. Eight park-and-ride lots are close to AAFB, several of which are Metrorail stations.

Most of the bus service near AAFB is concentrated on the western periphery of the base with some service to the Main Gate. Metrobus routes near AAFB include the D12-14, C11 and C13, K11-13, J11-13, and W15. TheBus, Prince George's County's local bus service, operates a few routes within the vicinity of AAFB, including the 20, 30, 32, and 33. No MTA commuter bus directly serves AAFB.

AAFB used to operate shuttle service within the base, but it was discontinued in 2006 due to low ridership.

Because AAFB is closely located to Washington, D.C., the area adjacent to the base's northwest side along Allentown Road includes adequate sidewalks. The remaining periphery of the base is relatively isolated

and not well-connected to its surroundings. As such, most of the area surrounding the base features poor sidewalk connectivity. Sidewalks are abundant within the base west of the airfield. However, sidewalks are less common east of the runways.

Existing transportation services are summarized in Figure 34 on the following page.

### Planned

Planned transportation services for AAFB can be found in the *Transportation Improvement Program for the Metropolitan Washington Region, FY2010–2015, Maryland State BRAC Action Plan, Maryland's Consolidated Transportation Program, and Prince George's County BRAC Action Plan*. Notable projects with direct relevance to AAFB include new and modified transit service, a new interchange at Suitland Parkway and Pennsylvania Avenue, and other planning studies. Projects and studies beyond 2020 that may affect travel to and from AAFB are discussed further in the *Constrained Long-Range Transportation Plan*, which is prepared by the Transportation Planning Board (TPB).

### Demand

The draft AAFB transportation management plan reviewed for this study did not contain mode share goals. However, census data shows that 2.5 percent of AAFB employees take some form of transit.

This study estimates a similar 2.5 to five percent transit mode share range by 2012, as summarized in Table 18. Some of the non-BRAC growth will occur after the September 2011 deadline, thus the forecast year for AAFB is 2012, compared to 2011 for all the other sites. This study assumes transit mode share will remain consistent and within the estimated range.

Table 18: Estimated transit trips for AAFB in 2012

Scenario	Transit Share	Personnel	Transit Round Trips
Low	2.5%	16,600	420
High	5.0%	16,600	830

## Transit Service and Facility Proposals

Figure 33 summarizes the residential distribution of current AAFB employees. The figure shows that most of current personnel live in Prince George's County (which includes the base itself), while a significant amount of personnel live in other areas of Maryland. About a quarter of all personnel commute from northern Virginia. Transit service proposals have been developed in response to this distribution by both improving local bus service for the majority that lives near the installation, and adding express bus services and strengthening connections to the Metrorail system for those that do not. All service proposals are summarized in Table 19 and displayed in Figure 35.

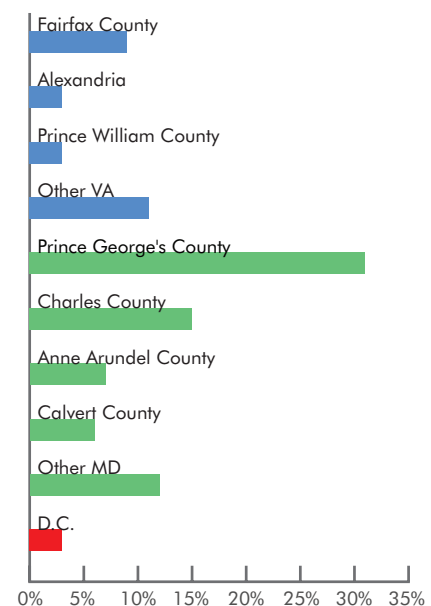


Figure 33: Residence of existing AAFB personnel and employees



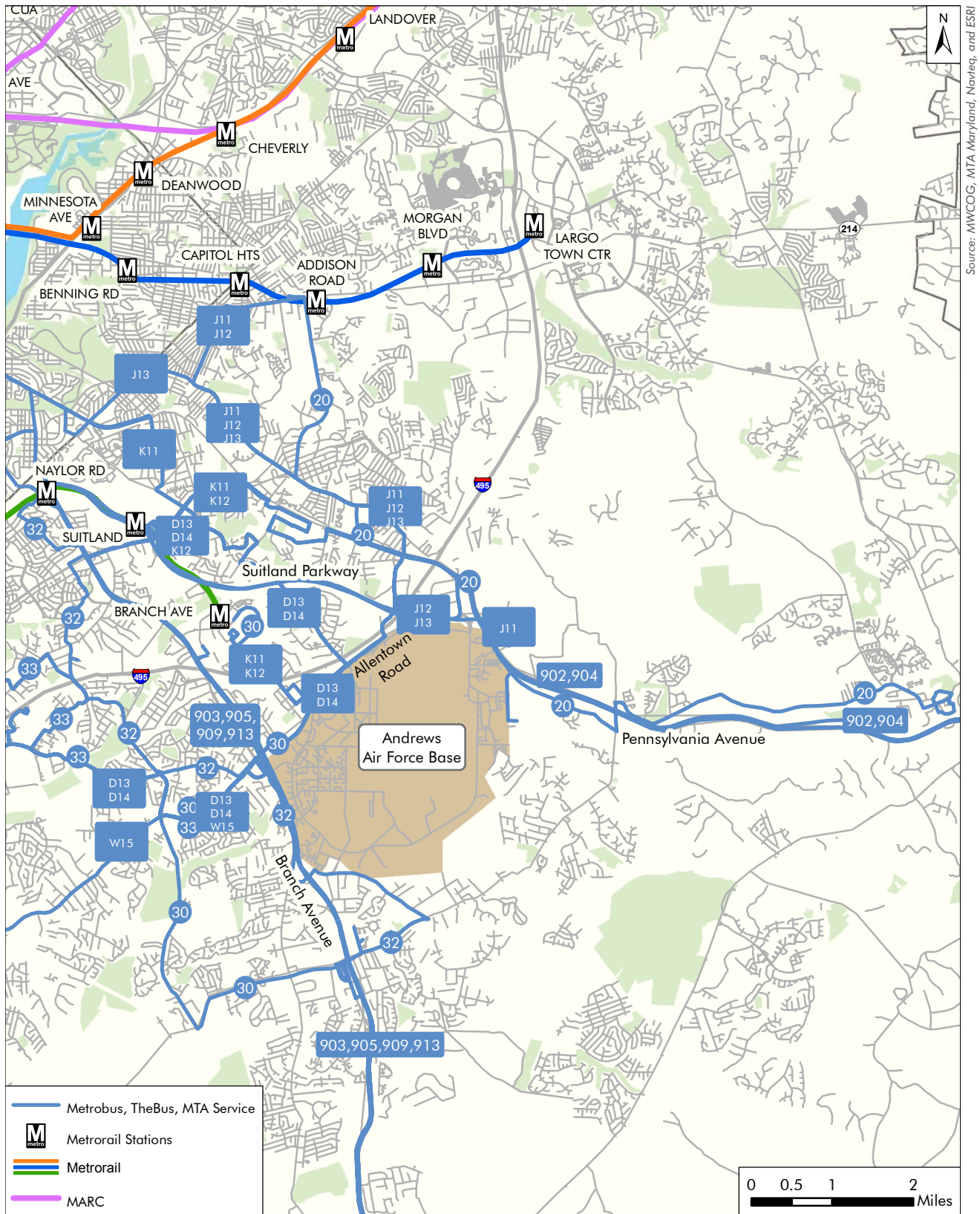


Figure 34: Existing transit service near AAFB

Table 19: Summary of AAFB service proposals

Purpose	Proposal
Direct local service	Implement a variant of TheBus route 20 serving the North Gate Implement TheBus service to Marlton and Rosaryville Implement a variant route based on Metrobus routes J11, 12, and 13
Direct express service	Implement express service between National Harbor and Largo Town Center Metrorail station via I-495 with a direct stop at Main Gate Implement express service between New Carrollton and Branch Avenue Metrorail stations via I-495 with a direct stop at Main Gate Implement a variant of MTA route 901 with a stop at Main Gate Modify MTA route 902 to stop at Main Gate
Connections to major transit centers	Improve connection to Branch Avenue Metrorail station with new shuttle service Improve connection to Addison Road-Seat Pleasant Metrorail station with new variant of TheBus route 20 Improve connection to King Street VRE and Metrorail station with new shuttle service

### Local Bus Proposals

The Prince George's County's *Transit Service and Operations Plan* (TSOP) proposes a new route from Upper Marlboro to AAFB via Marlton and Rosaryville. Another alternative proposed in this study would separate this route into two routes, the first of which would be a variant of TheBus route 20 that would serve AAFB's North Gate. Early morning and late evening eastbound and westbound trips that do not serve the Melwood Training Center could serve the North Gate. Later trips already have a scheduled deviation to the Melwood Training Center. Of these, every alternate trip could serve AAFB instead. Similarly, evening alternate trips from 4:00 to 5:20 p.m. in both the directions could serve AAFB.

The second route would be a new local route that would serve Marlton and Rosaryville. The service would operate during peak periods only, 5:30 to 8:30 a.m. and 3:30 to 6:30 p.m. This route would serve the Pearl Harbor Gate if it could be designed to connect to an on-base shuttle serving that gate; otherwise, it would serve the Main Gate.

AAFB currently lacks direct service from the Marlboro Pike and Capitol

Heights areas. In response, this study proposes a new variant of the Marlboro Pike Line (J11, 12, and 13) that would serve AAFB's North Gate on eastbound morning trips and westbound evening trips, with at least three trips in each time period. This route would be supplemented by the modified TheBus route 20.

The TSOP has proposed reducing the headway TheBus route 30 from 40 to 30 minutes, beginning in the first year of plan implementation. This route provides the only service west of the base. The TSOP also proposes adding Saturday service in the fourth year of plan implementation. This route is not expected to attract many destined for AAFB because the service is indirect, infrequent, and does not provide a direct connection to buildings at the installation.

### Express Bus Proposals

AAFB's location adjacent to I-495 and several existing MTA commuter routes make it an ideal candidate for express service. This study proposes several express routes and one modification of an existing route to allow for more commuting flexibility.

In addition to local route modifications, the Prince George's

County TSOP proposes longer-term express service between Largo Town Center Metrorail station and National Harbor. This service would operate via I-495 from 6:00 a.m. to 11:00 p.m., with 20-minute peak and 30-minute off peak headway. The TSOP proposes this route stop at Branch Avenue Metrorail station and not AAFB. If demand warrants, adding a stop at the Main Gate would add four minutes of total running time and could be by request only. Total running time between Largo Town Center station and AAFB would be 15 minutes in uncongested conditions, though peak service would be more reliable if buses could use shoulder lanes.

This study also proposes a peak-period express route operating between New Carrollton and Branch Avenue Metrorail stations via I-495 with a stop at AAFB's Main Gate. New Carrollton station is a critical intermodal hub as it provides connections to the MARC Penn Line, the Metrorail Orange Line, Amtrak's Northeast Corridor, future Purple Line service, and many express and local buses. Stopping at Largo Town Center is not recommended since this additional stop would add at least eight minutes to the running time (there is no direct connection from I-495) and the station would already be served by the previous TSOP proposal. This proposal would also benefit from an I-495 bus bypass shoulder policy.

Finally, two MTA commuter bus routes pass near AAFB without stopping. MTA should establish a new variant of route 901 that would stop at the Main Gate and terminate at Branch Avenue Metrorail station. For personnel residing in Calvert County, MTA would only need to add an AAFB stop to commuter route 902, which already passes by the base. Not all route 902 trips would serve

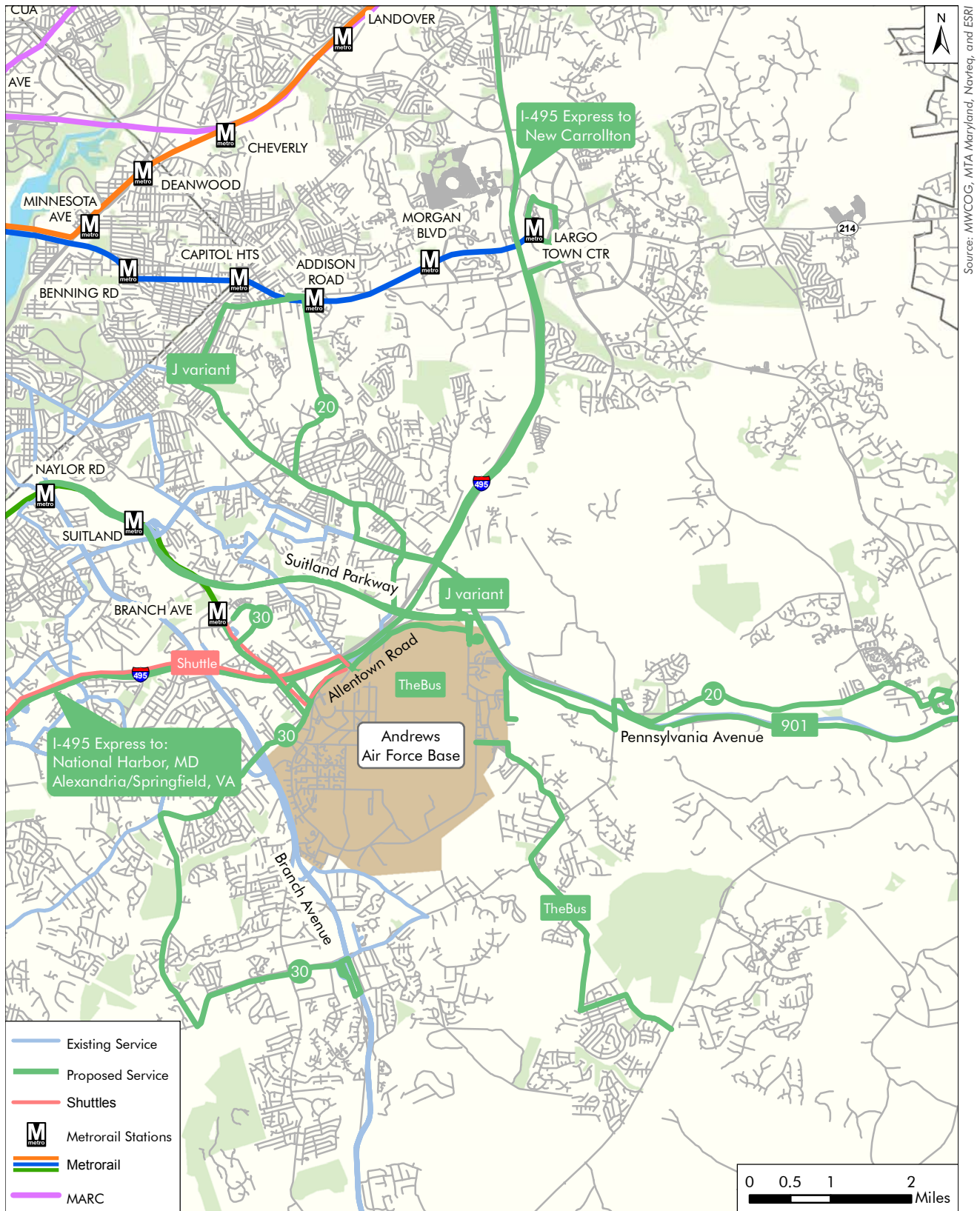


Figure 35: Proposed transit service near AAFB



the Main Gate, however. Each service would have to offer at least three trips in the peak period and direction to be viable. Over 20 percent of AAFB personnel live in southern Maryland counties served by these routes.

### Shuttle Proposals

A frequent DoD-operated shuttle bus to Branch Avenue Metrorail station is needed. After serving the station, this proposed shuttle would enter at the Main Gate and circulate within the base. A shuttle is important to facilitate access to AAFB from the regional transit system and also to facilitate movements within the installation for personnel not arriving by private vehicle. Such a shuttle will be evaluated as part of the AAFB TMP.

Additionally, this study proposes peak-period DoD-operated shuttle from the King Street Metrorail station to serve the large minority of AAFB personnel who reside in Virginia. Originating the shuttle at King Street station would allow for connections with both VRE lines, Metrorail's Blue and Yellow lines, and other local and regional buses. This shuttle could also be used in the reverse direction for WHS employees living in Maryland, assuming the proposed King Street station DoD shuttle to the Mark Center is implemented.

### Customer Facility Improvements

Customer facility needs are summarized in Table 20. One of these improvements is a bus stop along Allentown Road near the currently closed West Gate. This improvement is proposed under the assumption that the West Gate will be opened as an off-road pedestrian-only entrance, as proposed in the AAFB TMP.

Other improvements are needed at the Main, North, and Pearl Harbor Gates, with an emphasis on the Main Gate. As most of the service proposals

Table 20: Summary of proposed customer facility improvements at AAFB

Location	Improvements	Reason
Main Gate	New transit center (three shelters and benches, large pedestrian pads, sidewalk, lighting, trash bins, information signage, LED Next Bus display, and two bus bays at minimum)	To serve as a transfer point between proposed routes and internal and external AAFB shuttles
North Gate	New bus stop (sign, sidewalk, and pedestrian pad)	To serve as a transfer point between peak period local service and a potential extension of the internal shuttle
Pearl Harbor Gate	New bus stop (sign, sidewalk, and pedestrian pad)	To serve as a transfer point between proposed Marlton/Rosaryville local route and potential extension of the internal shuttle
Allentown Road @ Suitland Road (westbound)	Information signage, trash bin	To serve neighborhoods and retail center west of AAFB (TheBus 30 and Metrobus D13, D14)
Allentown Road @ Robert M Bond Drive (West Gate)*	Shelter, bench, larger pedestrian pad, information signage, trash bin, crosswalk improvements	To better serve and encourage use of pedestrian entrance at West Gate (TheBus 30 and Metrobus D13, D14)

\* Location of a potential transit center if demand warrants

would utilize the Main Gate, this location would require a transit center large enough to accommodate the estimated demand but not too intrusive to cause additional traffic congestion. While a potential transit center can be broken down into common elements as expressed in Table 20, its actual design would require further, more detailed operations planning and engineering.

# Fort Meade

Odenton, Anne Arundel County, Maryland

Table 21: Key characteristics at Fort Meade

	Now	By 2015	Growth
Personnel	40,000	62,000	55%
Living Units	3,007	2,627	-13%
Parking	Unknown	Unknown	Unknown

## Background

Fort Meade, established in 1917 during World War I and used to train over 3.5 million troops during World War II, is a U.S. Army base about 20 miles north of Washington, D.C. near Odenton, Maryland. The 5,067-acre installation is bounded by the Baltimore-Washington Parkway, Annapolis Road, and Patuxent Freeway, and contains a variety of administrative and operational facilities, including the headquarters for the National Security Agency (NSA). Fort Meade currently includes 40,000 personnel, excluding NSA employees, and houses many throughout its 3,007 living quarters. Including the NSA, Fort Meade is the largest employer in the State of Maryland. The amount of parking is unavailable, though the total is estimated to be as high as 22,000 spaces.

## Growth

Most of Fort Meade's BRAC growth is attributable to the Defense Information Systems Agency (DISA), Defense Media Activity (DMA), and Adjudication Activities. Together, these three activities will account for 1.24 million square feet of new administrative and research space. DISA will account for 75 percent of the 5,700-personnel increase associated with BRAC actions. The Army will construct an additional 3,968 parking spaces to accommodate new employees and visitors.

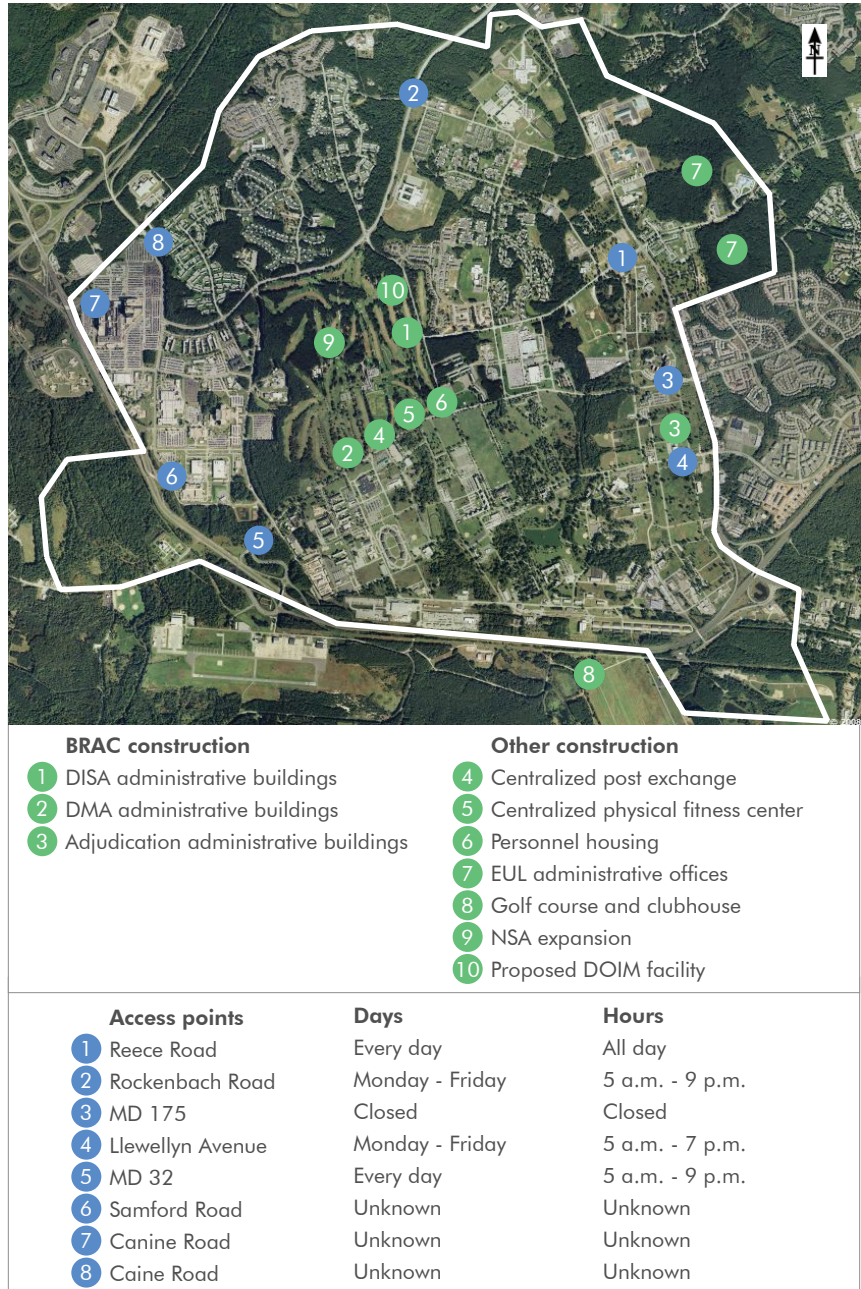


Figure 36: Access points and new and renovated facilities at Fort Meade

Non-BRAC actions, like NSA expansion and the enhanced use lease (EUL) program at Fort Meade, could accelerate growth by adding up to

16,000 personnel and employees by 2015. The EUL process, which leases underused DoD-owned land to fund construction activities at the base,

would allow private companies to lease and develop 173 acres of land along the eastern edge of the base for a 50-year period. EUL actions are expected to add up to two million square feet of private development.

#### Access

Access to Fort Meade is and will remain limited. Eight access points with security gates are located primarily on the west and east sides of the base, each with a 100 percent ID check policy. Three of the eight access points are for the NSA only. The location and hours of operation of each gate are revealed in Figure 36.

### Transportation Services

#### Existing

Fort Meade's gates have excellent highway access, as the base is cradled by the Patuxent Freeway and Baltimore Washington Parkway, and also within several miles of I-95. However, Fort Meade's *Comprehensive Expansion Master Plan* found that Annapolis Road, which provides access to the main gate at Reece Road, is the base's most pressing congestion issue, followed closely by nearby highways at or exceeding vehicle capacity. The plan states that there is little opportunity to increase highway

capacity around Fort Meade until 2015 or later, which is beyond the horizon of this study.

Fort Meade lies outside the Metro compact, meaning the nearest Metrorail stations, Greenbelt and New Carrollton, are about 20 miles away. However, two MARC commuter rail stations, Odenton and Savage, are located nearby within several miles of the main access points along Annapolis Road. The base is also within several miles of 17 park-and-ride lots, several of which are MARC commuter rail stations.

Central Maryland Regional Transit (CMRT) and Howard Transit provide local bus service in the Fort Meade area. Only CMRT, via route K, serves Fort Meade directly. Other nearby CMRT routes include the F (serving the NSA on the western side of Fort Meade), J, and B. Even though Metrobus does not serve Fort Meade, route B30, an express line between Greenbelt station and the Baltimore-Washington International Airport, runs along I-95 and within a few miles of the base.

Fort Meade is well served by shuttle buses, including the Link Shuttle between BWI and NSA, NSA shuttles

from Odenton station and from Savage station, a pilot shuttle program connecting Fort Meade to Odenton and Savage stations, and the Defense Information School (DINFOS) shuttle that circulates within the base.

The base is very large and isolated from surrounding communities. Not all facilities around Fort Meade are served by sidewalks, nor are the sidewalks interconnected throughout the installation in a manner to facilitate walking.

Existing transportation services are summarized in Figure 38 on the following page.

#### Planned

Planned transportation services for Fort Meade can be found in the Maryland's *Action Plan for Military Installations* and the Maryland *Consolidated Transportation Program*. Notable projects with direct relevance to Fort Meade include planning for a new 2,500-space garage at Odenton station as well as other planning projects and MARC commuter rail expansion to BRAC zones. For the long term, the TPB is studying a regionwide BRT network that would potentially serve Fort Meade.

#### Demand

Not many Fort Meade personnel commute by transit. According to census data, only 0.4 percent of personnel took some form of transit. This relatively low percentage is due to Fort Meade's remote location, large size, and lack of present transit options. Furthermore, the base has not formally established a transit mode share goal, as it lies outside of the National Capital Planning Commission (NCPCC) jurisdiction and is not required to develop a TMP.

The large number of personnel assigned to Fort Meade coupled with the very low existing rate of



Figure 37: Odenton MARC station



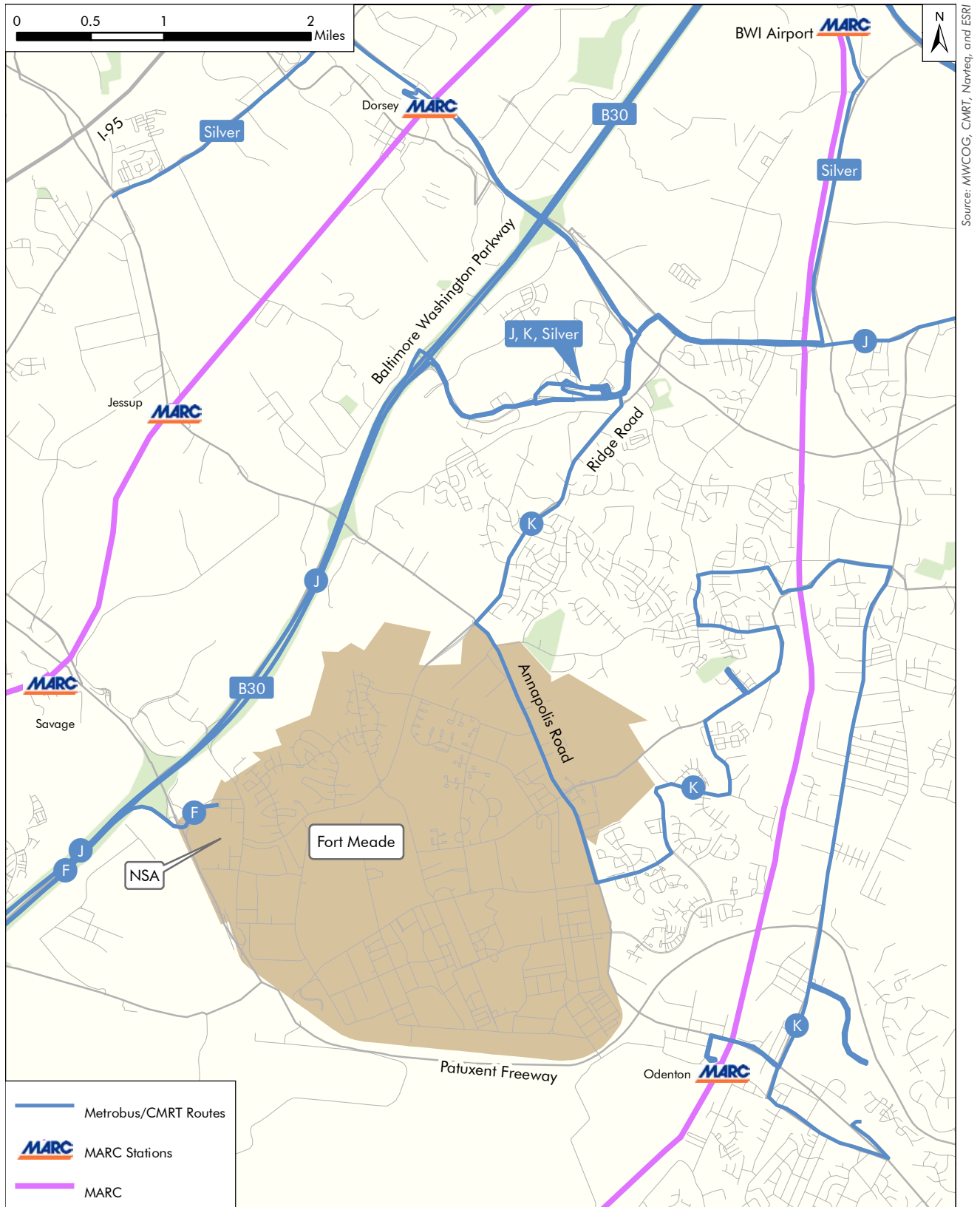


Figure 38: Existing transit service near Fort Meade

Table 22: Estimated transit trips for Fort Meade in 2011

Scenario	Transit Share	Personnel	Transit Round Trips
Low	1%	45,700	460
High	5%	45,700	2,850

transit use suggests that there could be potential for significant transit ridership growth if the base develops a comprehensive TDM program, offering incentives for transit use. This study estimates a one to five percent transit mode share range by 2011, as summarized in Table 22.

Fort Meade is unique among all sites in this study in that it is expected to grow significantly after BRAC recommendations are implemented. The EUL area could add up to an additional 16,000 employees if developed to its fullest. However, given the state of the economy, it is likely that this area will not see full build out by 2015.

This study has taken the possibility of EUL development into consideration when estimating future transit trips and proposing transit services, and estimates that transit mode share will remain consistent and within the estimated 2011 range.

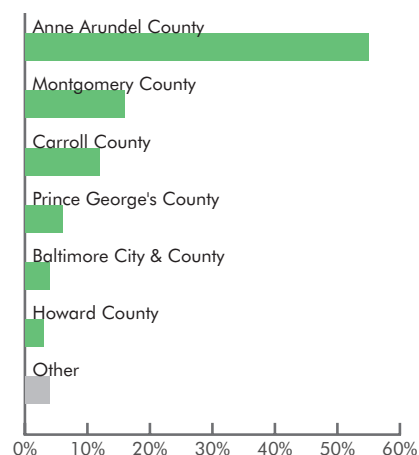


Figure 39: Residence of existing Fort Meade personnel and employees

## Transit Service and Facility Proposals

Figure 39 summarizes the residential distribution of current Fort Meade personnel. A majority of these personnel live in Anne Arundel County. Many of the incoming personnel live and work in northern Virginia. According to the Howard County TDP, 58 percent of these incoming employees surveyed said they would commute, not move.

This long distance, especially with Washington, D.C. in the middle, presents many challenges in developing service proposals. For example, adding a Fort Meade stop to some existing Metrobus B30 trips was not considered desirable due to the requirement of a considerable detour, its larger fare (the B30 fare is a \$6), and the importance of providing rapid and reliable transit service to the Baltimore-Washington International Airport. Proposals for Fort Meade thus focus on serving both nearby neighborhoods and far-off communities. All service proposals are summarized in Table 25 and displayed in Figure 40.

### Local Bus Proposals

All of the following local bus proposals have been identified in the

most recent TDPs for Anne Arundel or Howard Counties.

The Anne Arundel County TDP has proposed four new routes that would serve Crofton, Laurel, Arnold, and Piney Orchard, among others.

One of these new routes would operate between Crofton and Odenton station (route 1, Figure 40), where personnel could transfer to a shuttle to complete their trip. Contrary to the TDP proposal, this study proposes the route to not detour to the EUL area, which could be better served by a separate shuttle from Odenton station. However, if the public bus is permitted only to stop adjacent to Fort Meade (and not to circulate inside), as is likely, then the route could continue to and terminate at the EUL area.

Another new route would run between Severna Park and Odenton station as partial express service via I-97 and MD 32 (route 2, Figure 40). This study proposes extending the route south on College Parkway through Arnold and Cape Saint Clair, which could add up to 15 minutes, or extending service directly to Fort Meade instead of requiring a transfer at Odenton. The latter alternative may be operated as a DoD-provided route.

Table 23: Summary of Fort Meade service proposals

Purpose	Proposal
Direct local service	Increase frequency of and add a variant of CMRT route F
	Implement service to and from Piney Orchard and Columbia Gateway (Figure 40 routes 3 and 4, respectively)
	Restructure Howard Transit Blue Route (Figure 40 route 5)
	Restructure and extend Connect-A-Ride routes K
Direct express service	Implement express service to and from Annapolis (X1)
	Implement express service to and from Greenbelt Metrorail station (X2)
	Implement express service to and from Gaithersburg via the ICC (X3)
	Implement express service to and from Brooklyn Park and Glen Burnie (X4)
Connections to major transit centers	Improve connection to Odenton MARC station with new public shuttle service, and new local service to and from Crofton, Severna Park, Piney Orchard (Figure 40 routes 1, 2, and 3, respectively)
	Improve connection to Savage MARC station with new public shuttle service
	Improve connection to Greenbelt Metrorail station with new BWIP shuttle

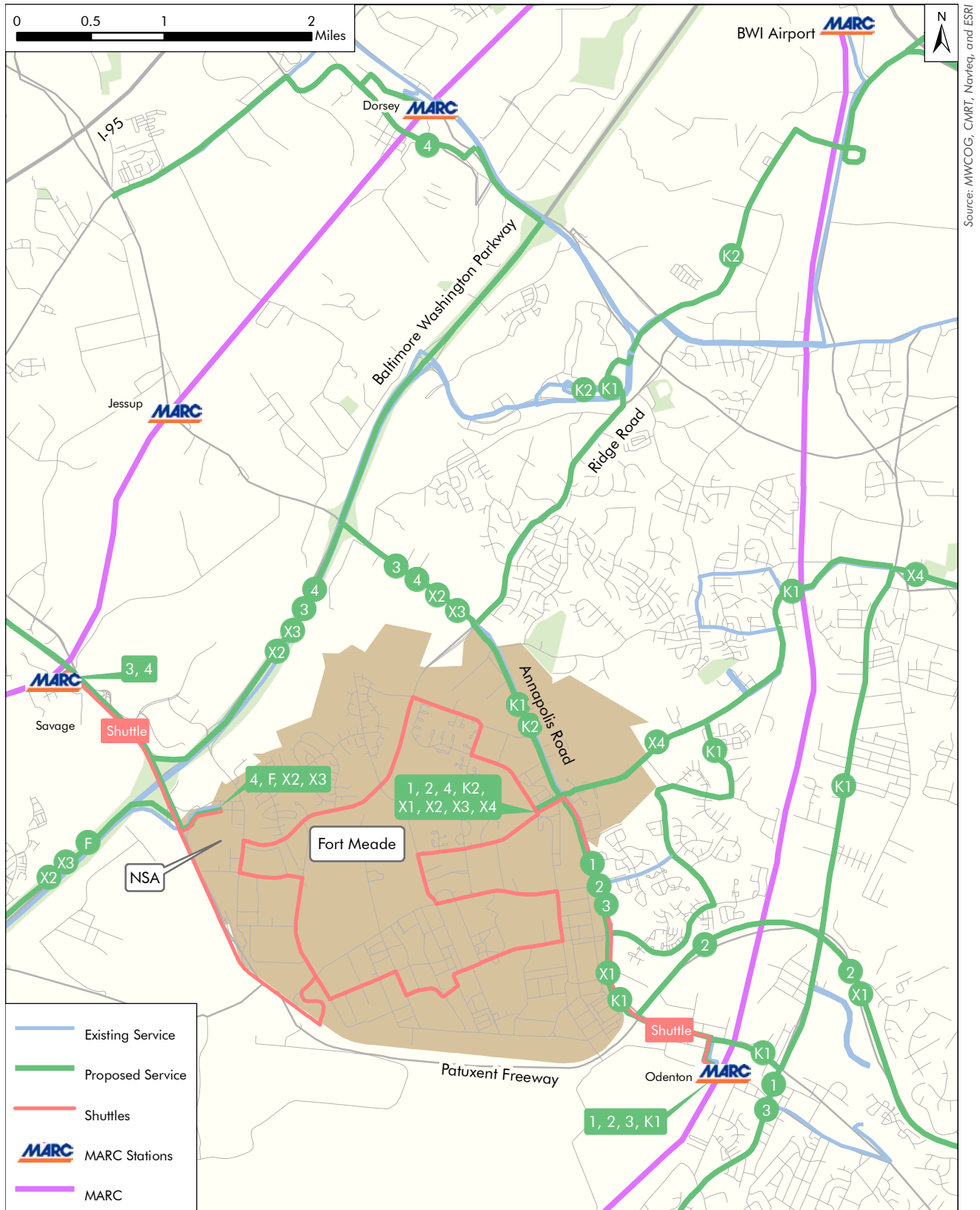


Figure 40: Proposed transit service near Fort Meade



Anne Arundel County designated a proposed new route between Piney Orchard and Odenton (route 3, Figure 40) a high priority, and operating funds and vehicles have been identified for this service. The route would not terminate at Odenton, instead continuing to Fort Meade and the EUL area, and then to Savage station.

Finally, the Anne Arundel TDP proposes to split and extend the existing Connect-A-Ride Route K. One route (called K1) would loop through neighborhoods in Severn and Odenton, connect to Arundel Mills Mall, and continue to serve the Main Gate at Reece Road. Route K1 would not enter Fort Meade. The other route (called K2) would connect the Baltimore-Washington Airport (BWI) to Anne Arundel Mills Mall, the EUL area, and Fort Meade. At the BWI MARC station, connections are available to Baltimore light rail, MTA route 17, Howard County Red Route, MARC, Amtrak, and shuttle buses to the airport terminals.

While the TDP did propose a new route to Russett Green, this study proposes modifying Connect-A-Ride Route F instead. Route F already passes by Russett Green between Laurel and the NSA visitor center, though it only offers two trips in each peak period. This route could be improved to provide four trips on 30-minute headways, and a variant could be added to serve the Laurel park and ride lot on Sandy Spring Road.

Howard County has proposed two routes in its TDP as well. One of which would serve Columbia Gateway, the Dorsey MARC station, and then enter Fort Meade at the Reece Gate to make several on-base stops (route 4, Figure 40). It would operate during peak hours and weekdays only, and on a 60-minute headway.

The second route proposed by Howard County would be a restructuring of the Howard Transit Blue Route (route 5, Figure 40). One variant would start in Clarksville while the other variant would start at Columbia Town Center, though both variants would serve Savage station, the NSA, the EUL area, and then enter Fort Meade and circulate within on base. These two variants would operate weekday peak hours only, on a 60-minute headway, largely as express routes. The route originating in Columbia should receive higher priority since it would serve higher density housing.

#### *Express Bus Proposals*

The MTA *Commuter Bus Study* has proposed several express bus services for the Fort Meade area. Travel time reliability for these routes would be strengthened if a bus bypass shoulder policy is implemented for periods of high traffic congestion.

The first MTA-proposed route is actually recommended as an express shuttle, not a commuter bus, between

the Harry S. Truman Park and Ride in Annapolis to Fort Meade via U.S. 301, I-97, and MD 32 (route X1, Figure 40). Anne Arundel County has proposed extending this route to the Navy Stadium Park and Ride in the center of Annapolis. This service would provide three trips to Fort Meade in the morning peak period and three return trips in the evening peak period. Parking at the Harry S. Truman Park and Ride lot is presently constrained.

Second, the MTA proposes express service between Greenbelt Metrorail station and Fort Meade via the Baltimore-Washington Parkway (route X2, Figure 40). The route could enter near the NSA and make several stops throughout the base. This service would provide three trips to Fort Meade in the morning peak period and three return trips in the evening peak period.

The Maryland Department of Transportation (MDOT) Secretary has approved an MTA-proposed route (route X3, Figure 40) from Gaithersburg to Fort Meade via the forthcoming Intercounty Connector (ICC). Proposed route 202 would include three morning peak trips to Fort Meade from an I-270 park and ride lot and the Shady Grove Metrorail station and three evening return trips, with one possible midday return based on demand. This route could start as early as fall 2010 when the initial ICC segment is completed.



Figure 41: Intercounty Connector construction

Lastly, the Fort Meade EIS recommended improving service to the Glen Burnie, Linthicum, and Brooklyn Park neighborhoods. Express service (route X4, Figure 40) would start in Brooklyn Park and continue to Glen Burnie where it would serve the light rail station. Residents of Linthicum and other nearby communities could take the light rail to Glen Burnie to change to the express bus. From Glen Burnie, this proposed service would travel to the Reece Road Gate via MD 174, making some stops in Severn on the way. The one-way trip length is 13 miles, and could be traveled in about 30 minutes if traffic is not particularly heavy.

#### *Shuttle Proposals*

As of February 2009, Fort Meade personnel have been granted the ability to use the NSA shuttle to and from Odenton MARC station. This is a step in the right direction, but additional shuttle service is still needed.

The Anne Arundel County TDP has proposed adding two additional shuttles: one to Odenton station and another to Savage station. Both shuttles would be open to the public and would serve the EUL area, though only the Odenton shuttle is proposed to operate on base after a security check. The Savage shuttle, as recommended in the TDP, would not circulate on base. Security requirements at Fort Meade are unknown, so the Odenton shuttle proposal may need modification if it cannot enter the base.

The BWI Business Partnership (BWIP) proposed adding shuttle service between Greenbelt Metrorail station and the NSA. More planning is needed, as BWIP has not yet determined if the shuttle will be open to Fort Meade personnel or if NSA employees will have exclusive use.

Table 24: Summary of proposed customer facility improvements at Fort Meade

Location	Improvements	Reason
Main Gate @ Reece Road	Transit center (two shelters with benches, trash bin, information signage, and improved lighting)	To serve passengers waiting to transfer to or from a DoD shuttle



Figure 42: Current view of Reece Road Gate

#### *Customer Facility Improvements*

Given that buses would likely not be able to operate within Fort Meade's perimeter, bus passengers would need to transfer to a DoD shuttle from proposed routes to reach their final destination, thus requiring a transit center at the Reece Road Gate.

The Reece Road Gate would need additional customer facilities as summarized in Table 24. This gate would likely need two standard shelters or one large shelter because it would act as the terminus for several routes and the majority of passengers would travel during peak periods only. Determining the proposed transit center's exact bus bay needs would require more detailed operational planning. However, given the number of proposals, this transit center would likely need a minimum of two bus bays.





# National Naval Medical Center

Montgomery County, Maryland

Table 25: Key characteristics at NNMCM

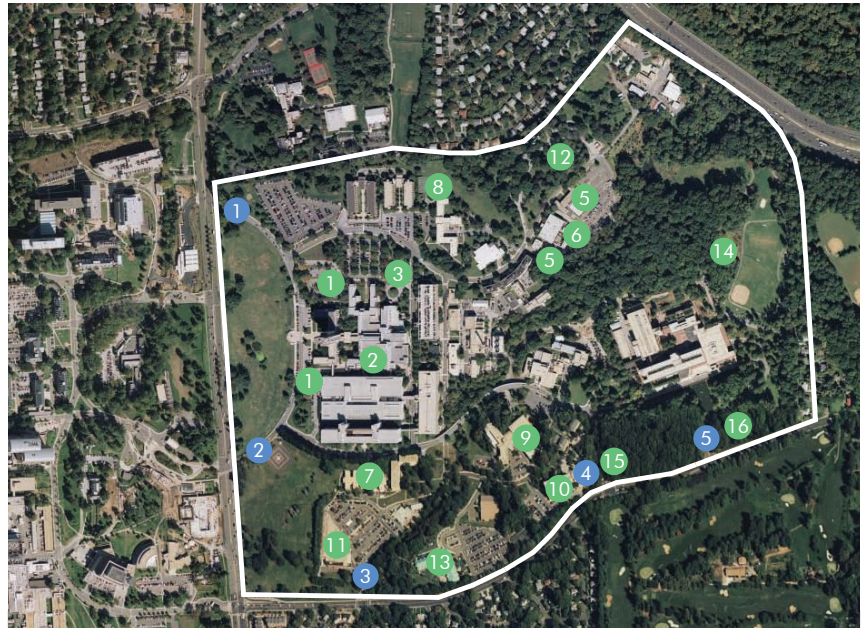
	Now	By 2015	Growth
Personnel	8,000	10,500	31%
Living Units	711	1,216	71%
Parking	6,083	8,087	33%

## Background

The National Naval Medical Center (NNMC) is a military medical campus located in southern Montgomery County, Maryland. Founded in 1940, the NNMC is one of the Navy's largest health care delivery systems, with almost half a million annual patients and visitors. The rolling 243-acre campus is adjacent to the National Institutes of Health (NIH) and is bounded by I-495 to the north and east, Jones Bridge Road to the south, and MD 355 (Rockville Pike) to the west. Currently, the NNMC employs 8,000 personnel, a majority of which are concentrated in the hospital facilities, and features more than 6,000 parking spaces, though less than half for employees. The campus also contains more than 700 permanent and temporary living spaces.

## Growth

The BRAC process will add up to 2,500 new personnel to NNMC. The campus will be renamed the Walter Reed National Military Medical Center (WRNMMC) after receiving realigned personnel from the closing Walter Reed medical facility in northern Washington, D.C. Various Air Force staff from across the nation will be relocated to the WRNMMC as well. Realigned employees will be located almost entirely within the hospital. By 2011, patient and visitor load is expected to double to 981,000 per year.



### BRAC construction

- 1 Medical care, new construction
- 2 Medical care, renovation
- 3 Parking
- 4 Warrior Transition Unit
- 5 Administrative space
- 6 Physical fitness center
- 7 Brain injury center
- 8 Bachelor enlisted quarters
- 9 Fisher Houses

### Other construction

- 10 Navy Lodge expansion
- 11 Navy exchange (NEX)
- 12 Senior officers quarters
- 13 Day care centers
- 14 Athletic fields
- 15 Security gates
- 16 Commercial vehicle inspection

### Access points

- 1 North Gate
- 2 South Gate
- 3 NEX Gate
- 4 Navy Lodge Gate
- 5 USUHS Gate

### Days

- Monday - Friday
- Every day
- Monday - Friday
- Monday - Friday
- Monday - Friday

### Hours

- 5 a.m. - 7 a.m.
- All day
- 5 a.m. - 7 a.m.
- 5 a.m. - 3 p.m.
- 5 a.m. - 8:30 a.m.

Figure 43: Access points and new and renovated facilities at NNMC

New housing will be constructed to accommodate additional personnel and patient growth. Employee parking will become more constrained. Once BRAC recommendations have been implemented, staff parking will total 2,462 spaces. Parking for patients,

visitors, and other uses is expected to grow significantly.

## Access

Access to NNMC is and will remain limited. Five access points with security gates are located on the west and south sides of the site, each with

a 100 percent ID check policy. The location and hours of operation of each gate are revealed in Figure 43.

## Transportation Services

### Existing

NNMC is located on Rockville Pike (MD 355) in proximity to the I-495/I-270 interchange, giving the site exceptional regional highway access. However, Rockville Pike and I-495 are some of the most congested roadways in the region, with more than 52,000 and 250,000 average vehicles per day, respectively.

NNMC's unique advantage is the nearby Medical Center Metrorail station, found on the west side of Rockville Pike directly across the street from the South Gate, that serves the Red Line. Medical Center station includes six bus bays for a variety of regional and local bus routes, several of which use the station as a terminal location. Kensington MARC station is the closest commuter rail location at 2.8 miles to the northeast, across I-495.

Medical Center station is served by the Metrobus J routes (J1, 2, 3, 7, and 9) and several Montgomery County Ride On route (30, 33, 34, 46, and 70). NNMC provides shuttle bus access from Medical Center station via the Metro Direct shuttle from 5:30 a.m. to 6:30 p.m. The Metro Direct shuttle only takes passengers to the main hospital. Three additional internal shuttle routes provide passengers with travel options within the campus from the main hospital.

The Medical Center area is fairly dense with relatively good sidewalk connectivity and some dedicated bicycle facilities. Sidewalks are available on both sides of Rockville Pike, with varying degree of quality and width. A paved, multi-use trail connects some surrounding neighborhoods and Old Georgetown

Road directly to Medical Center station. The Capital Crescent Trail and Bethesda North Trolley Trail are nearby, as well.

Existing transportation services are summarized in Figure 45 on the following page.

### Planned

Planned transportation services for NNMC can be found in the Maryland's *Action Plan for Military Installations* and the Maryland *Consolidated Transportation Program*. Notable projects with direct relevance to NNMC include nearby intersection upgrades and a potential vehicle and pedestrian tunnel near Medical Center station. Projects and studies beyond 2020 that may affect travel to and from NNMC are discussed further in the *Constrained Long-Range Transportation Plan*, which is prepared by the Transportation Planning Board (TPB).

### Demand

Up to 14 percent of current NNMC employees commute via some form of transit. The majority of these commuters arrive via Metrorail due to the proximity of Medical Center station. The NNMC TMP suggests a 30 percent transit mode share will be required due to parking constraints. However, because parking will be so constrained for the amount of employees by 2011, up to 45 percent of employees may need to arrive by public transportation.

This study estimates the 2011 transit mode share goal to fall somewhere between 30 and 45 percent, as summarized in Table 26. No significant growth is planned for NNMC beyond 2011, therefore transit mode share will likely remain within the estimated range. As the Purple Line becomes operational in the future, transit ridership may rise to the higher end of the range.

Table 26: Estimated transit trips for NNMC in 2011

Scenario	Transit Share	Personnel	Transit Round Trips
Low	30%	10,500	3,150
High	45%	10,500	4,730

## Transit Service and Facility Proposals

Figure 44 summarizes the residential distribution of current NNMC employees. Slightly less than half of all employees reside in Montgomery County, while more than a quarter live in other parts of Maryland. A 2002 survey of Walter Reed employees found that 80 percent lived in Maryland (with a concentration in the Silver Spring and White Oak areas), four percent in Virginia, and 5.5 in Washington. More of the Walter Reed employees are likely to take transit to work after their relocation.

Service proposals in this section have been tailored to reflect the residential locations of all employees. Montgomery County, and NNMC in particular, already has strong transit service. Therefore, service proposals will focus increasing transit's convenience and filling in the gaps where they may exist. All service proposals are summarized in Table 27 and displayed in Figure 47.

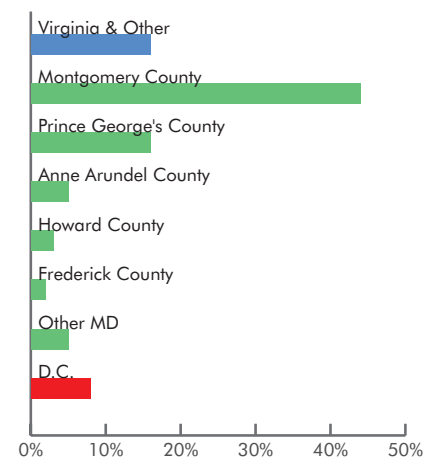


Figure 44: Residence of existing NNMC employees



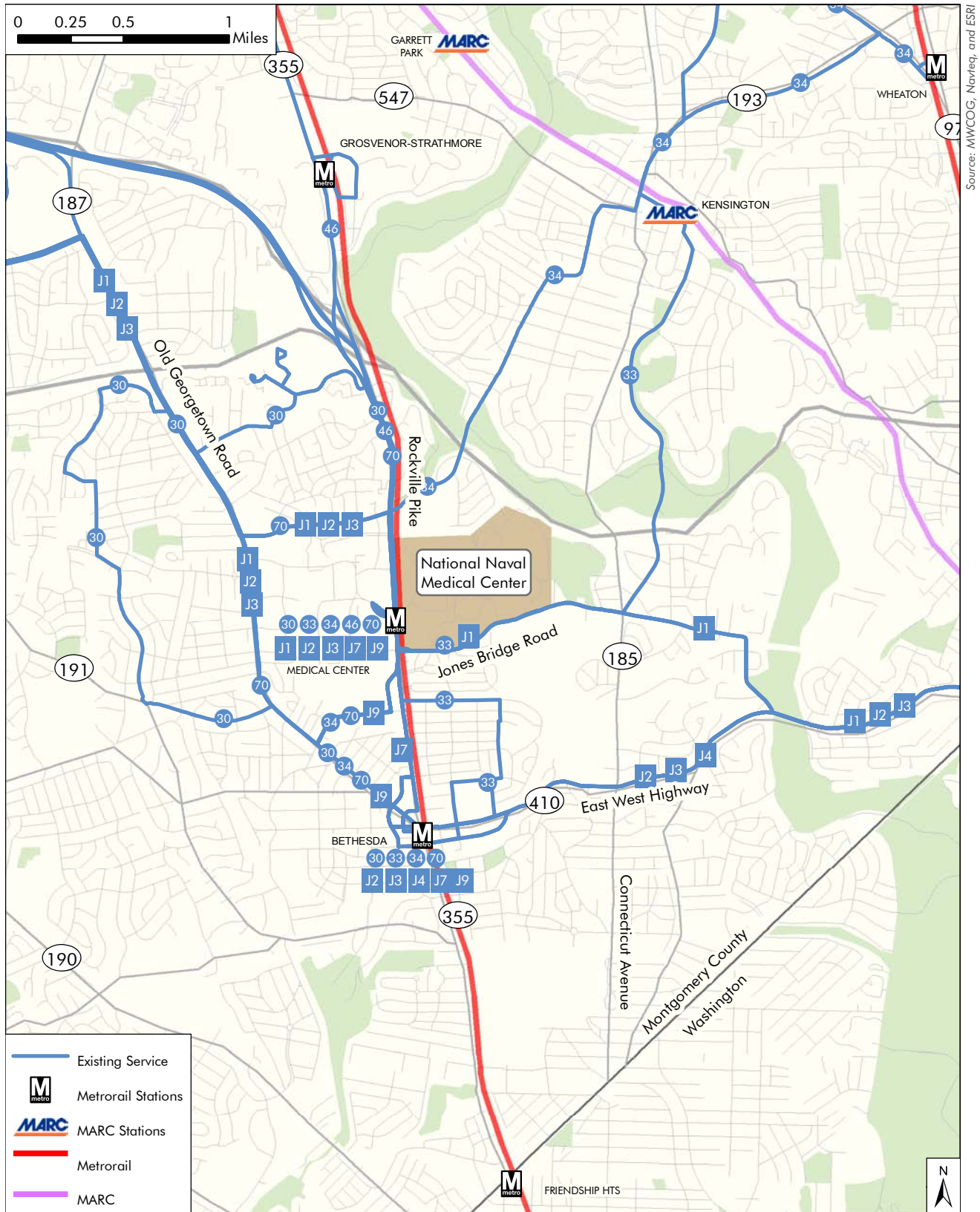


Figure 45: Existing transit service near NNMC



### Local Bus Proposals

The Bethesda-Silver Spring Metrobus routes (Routes J1, 2, and 3) provide direct service between Silver Spring and Medical Center Metrorail stations. Until the Purple Line is completed and operational, these routes will remain the primary east-west connection in southern Montgomery County. Service improvements on these routes should be made when necessary to relieve crowding and improve reliability.

Ride On Route 30 operates in a partial loop, with a gap between Medical Center and Bethesda Metrorail stations. If demand warrants, this route could be extended into a full loop to significantly decrease travel times for residents along Huntington Parkway and Old Georgetown Road. Extending this route would also decrease travel times to downtown Bethesda.

### Express Bus Proposals

Metrobus route J9 and Ride On route 70 provide express service to Gaithersburg via HOV lanes on I-270. These lanes are planned to be extended farther north. Once completed, routes J9 and 70 should be extended to better serve MARC and other park and ride lots. Additionally, midday and late evening trips should be added to these routes to increase their convenience to employees, patients, and visitors alike. Current ridership figures suggest that further J9 service may already be warranted. Its average maximum load in the peak hour exceeds the number of seats.

This study proposes a direct connection from the Columbia Pike (U.S. 29) corridor. A new 45-minute route would start at the Burtonsville Park and Ride, then serve the Greencastle Road park and ride and the White Oak Shopping Center. It would then run express via U.S. 29, I-495, MD 185, and Jones Bridge Road

Table 27: Summary of NNMC service proposals

Purpose	Proposal
Direct local service	Increase frequency to Metrobus routes J1, 2, and 3 until the opening of the Purple Line Extend Ride On route 30
Direct express service	Implement midday and late evening trips to Metrobus route J9 and Ride On route 70 Implement express service to and from Columbia Pike corridor (U.S. 29) Implement express service to and from Greenbelt Metrorail station via I-495 until the opening of the Purple Line
Connections to major transit centers	Implement midday and late evening trips to the MARC Brunswick Line Implement planned express service to the Rockville Metrorail station from the Columbia Pike corridor via the ICC

to Medical Center station, and then continue to and terminate at Bethesda station. The route would operate at peak times in the peak direction only.

An MTA-approved ICC express route would also serve the Columbia Pike corridor, but would first travel to Rockville before continuing to Medical Center and possibly Bethesda. Alternatively, passengers could transfer to Metrorail at Rockville station.

Finally, this study proposes express service between Greenbelt and Medical Center stations via I-495, providing a connection to NNMC employees taking the MARC Camden Line. Service would operate only during the peak period, and would

no longer be needed once the Purple Line is operational. This route would benefit from a bus bypass shoulder policy. Maryland State Highway Agency (SHA) would need to study shoulder use on the congested Beltway to better understand operational safety.

### Commuter Rail Proposals

The last morning MARC train arrives in Rockville at 8:34 a.m. and the first afternoon train departs at 2:12 p.m. The last northbound evening trip departs Rockville at 7:42 p.m. Providing later morning trips, earlier afternoon trips, and possibly later evening trips would help those who work unusual schedules. However, in addition to the cost of providing more train trips, ridership is constrained



Figure 46: Evening MARC service

Source: flickr/Gillianhome



Figure 47: Proposed transit service near NNMC

by the lack of parking spaces at most stations in the corridor, with the exception of Metropolitan Grove.

#### *Shuttle Proposals*

NNMC already operates shuttle service from Medical Center station.

#### *Customer Facility Improvements*

Both bus stops along Rockville Pike near NNMC feature adequate amenities, according to Metro bus stop guidelines.

New or enhanced service proposals would directly serve Medical Center station and not these stops. This Metrorail station already contains bus facilities and amenities, with the exception of bike facilities. Medical Center station has one of the highest bike access mode shares in the Metrorail system, and includes 38 bike lockers and 88 bike racks. All lockers are utilized as of April 2009 and 35 percent of all bike racks were used in 2006. This station is a likely candidate for additional bike facilities.

Metro recently studied access to Medical Center station and developed alternatives to promote pedestrian safety and to reduce traffic delay for vehicles exiting NNMC and the National Institutes of Health. The study found that the alternative with high-speed elevators and a pedestrian tunnel under Rockville Pike would provide the greatest benefit.

Montgomery County has applied for both Defense Access Road and TIGER (Transportation Investments Generating Economic Recovery) grant funding with a modified tunnel alternative that would wide enough to accommodate vehicles. The DoD approved the DAR funding request of up to \$20 million for a transit-oriented project in its FY '10 budget, though Congress ultimately must appropriate funding. The project was not awarded TIGER grant funding.



Figure 48: Medical Center Metrorail station bus bays and shelters

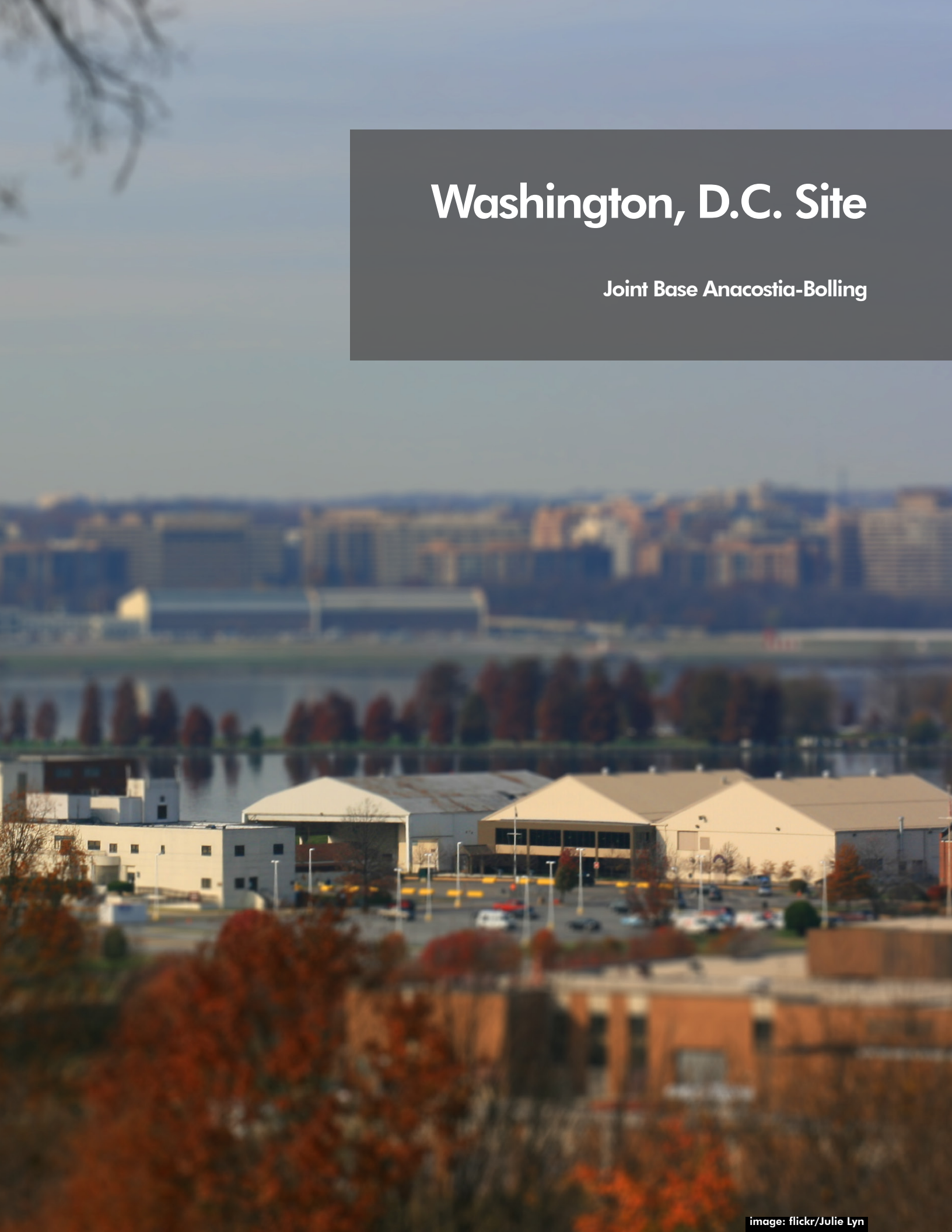






# Washington, D.C. Site

Joint Base Anacostia-Bolling







# Joint Base Anacostia-Bolling

Washington, D.C.

Table 28: Key characteristics at JBAB

	Now	By 2015	Growth
Personnel	13,000	13,650	5%
Living Units	1,040	1,090	5%
Parking	6,987	6,987	None

### Background

Bolling Air Force Base (BAFB) and the Naval Support Facility Anacostia (NSFA), more commonly known as Anacostia Annex, are contiguous DoD facilities located between the Potomac River and I-295 in Washington’s Southwest quadrant. Both opened in 1918, and both served as some of the region’s first airfields. Today, BAFB houses the 11th Wing and provides ceremonial assistance to the White House, while NSFA is the headquarters for the Navy Office of the Chief of Information and houses support helicopters for Marine Force One.

The BRAC process recommended these sites undergo base operating support consolidation, forming Joint Base Anacostia-Bolling (JBAB). These combined bases include 13,000 employees and personnel (10,000 at BAFB and 3,000 at NSFA). Between the bachelor enlisted and officer quarters, family homes, and temporary quarters, both bases have 1,040 housing units. The bases include almost 7,000 parking spaces.

### Growth

Once all realignments, both into and out of JBAB, are completed, the base will gain approximately 650 personnel. All additional personnel will be located in former NSFA area at the northern end of the base. The base will construct a new building to accommodate this increase, but its



BRAC construction		Other construction	
Naval Systems Management Activity (location unavailable)		Unknown	
Access points		Days	Hours
1	Firth Sterling Gate	Unknown	Unknown
2	Main Gate	Unknown	Unknown
3	Overlook Ave. Gate	Unknown	Unknown

Figure 49: Access points and new and renovated facilities at JBAB

exact location is unavailable. Total parking will remain the same. About 50 living quarters will be added by 2015.

### Access

Access to the JBAB is and will remain limited. Three secure access points are

located on the east and south sides of the site, each with a 100 percent ID check policy. Gate locations are shown in Figure 49. Hours of operation for each gate are unknown.

## Transportation Services

### Existing

JBAB's location adjacent to I-295 ensures it has adequate highway access. The base has direct access via Malcolm X Avenue SE from the Main Gate. Traffic near the base is considered congested, as reported in MWCOG's 2008 *Traffic Survey*, with I-295, South Capitol Street, and the 11th Street Bridge as the most congested.

Anacostia station is the nearest Metrorail station at 0.5 miles from Firth Sterling Gate. Congress Heights station is located 1.4 miles from the Main Gate. Thirteen park-and-ride lots are within a six-mile radius of JBAB, including several Metrorail stations with paid lots and parking garages as well as few free lots at nearby businesses.

Firth Sterling Gate and the Main Gate are served by transit via Metrobus routes (A9; P17, 18 and 19; and W4, 13, and 14) ) and one MTA Commuter Bus route (907). Only routes A9, P17, P19, W13, and 907 provide peak period service to the base.

Bolling is served by two shuttles: one to the Pentagon and the other to Anacostia Metrorail station. The Pentagon shuttle offers seven trips per day while the Anacostia station shuttle provides 20-minute headway service during peak periods.



Figure 50: Anacostia Metrorail station pylon

Sidewalks and pedestrian entrance points are available at both the Main Gate and the Firth Sterling Gate. However, field surveys done as part of the Bolling TMP point out deficiencies including lack of proper signage, missing curb cuts, and crosswalk inconsistencies.

Existing transportation services are summarized in Figure 52 on the following page.

### Planned

Planned transportation services for JBAB can be found in the *Transportation Improvement Program for the Metropolitan Washington Region, FY2010–2015*. Notable projects with direct relevance to JBAB include the Anacostia streetcar and the Frederick Douglass Memorial Bridge (South Capitol Street). Projects and studies beyond 2020 that may affect travel to and from JBAB are discussed further in the *Constrained Long-Range Transportation Plan*, which is prepared by the Transportation Planning Board (TPB).

### Demand

Census data shows that slightly more than four percent of all Joint Base personnel commute by public transportation. The draft TMP provides some suggestions related to the promotion of public transit, but does not provide specific mode share targets. This study estimates transit mode share to at least stay constant at four percent, but a share of eight percent seems plausible if some of the proposed improvements to transit service are implemented and parking supply continues to be constrained.

Table 29: Estimated transit trips for JBAB in 2011

Scenario	Transit Share	Personnel	Transit Round Trips
Low	4%	13,650	550
High	8%	13,650	1,090

No other major changes to the installation are planned. Over time, relocated personnel are expected to move closer to the installation, but no change in transit use is expected compared to the estimated 2011 range summarized in Table 29.

## Transit Service and Facility Proposals

Figure 51 shows that the majority of residences of JBAB personnel are almost evenly split between Fairfax County, Prince George's County, and Washington. The remaining personnel live in other areas of Virginia and Maryland. Since most of the residents live in Metrorail-accessible locations, and because JBAB is so close to Anacostia station, transit service proposals for JBAB are focused on increasing service between Metrorail and the base's main gates (see Figure 55). All service proposals are summarized in Table 30.

### Streetcar Proposals

The District Department of Transportation is currently planning and has begun constructing a 37-mile streetcar system. The first phase will be located in Anacostia and operate along South Capitol Street to Firth Sterling Avenue, Howard Road, and Martin Luther King Jr. Avenue, passing by Anacostia Metrorail

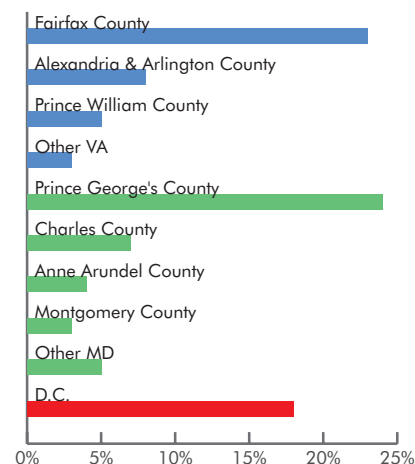


Figure 51: Residence of existing JBAB personnel and employees





Source: MWCOC, Navteq, and ESRI

Figure 52: Existing transit service near JBAB

station and JBAB's Firth Sterling Gate. Eventually the Anacostia segment will continue along to the 11th Street Bridge and onto M Street SE.

The base's draft TMP recommends extending the Streetcar to a stop near the Defense Intelligence Analysis Center access road. A stop at this location would bring the streetcar beyond Firth Sterling Gate but not quite to the Main Gate. The stop would require a new pedestrian entrance control facility with secure biometrics at South Capitol Street.

### Shuttle Proposals

Even once the first phase of the streetcar is completed in 2012, the DoD shuttle to Anacostia station will still be necessary. The shuttle will be needed to provide direct service to on-base buildings, while the streetcar is only planned to serve the Naval Annex portion of the site. Even the proposed extension to serve the DIAC would not provide a convenient trip for many personnel who work in buildings farther south. Additionally, current shuttle bus service frequency should be increased to every 10 minutes to provide an average wait of five minutes. If demand is sufficient, peak shuttle service could be split into two routes to provide a quicker trip to different portions of the installation.

Off-peak shuttle service should be added, and could be provided on demand. It could service both the DIAC and JBAB. The shuttle vehicle would wait at Anacostia Station after the morning peak through early afternoon and then wait on base in the afternoon before and after the afternoon peak regular service.

The District is encouraging the use of the Anacostia station's bus garage north of I-295 as the point of pick-up and drop-off for future shuttle buses to avoid impacting traffic along Howard Road.

Table 30: Summary of JBAB service proposals

Purpose	Proposal
Connections to major transit centers	Implement planned Anacostia Streetcar to Firth Sterling Gate and the Defense Intelligence Analysis Center from Anacostia Metrorail station
	Increase frequency and add off-peak service to existing shuttle from Anacostia Metrorail station
	Use Anacostia Metrorail station's north parking garage as pick up and drop off point for shuttle service
	Add sidewalks and crosswalks along Firth Sterling Avenue SE and adjacent to the Main Gate and Firth Sterling Gate

Table 31: Summary of proposed customer facility improvements at JBAB

Location	Improvements	Reason
South Capitol Street @ Firth Sterling Avenue (southbound near side)	New transit center (one large shelter with benches, large pedestrian pad, sidewalk connectivity, improved lighting, trash bin, and LED Next Bus display)	To act as a waiting area for bus passengers leaving the base in the evening and for passengers waiting to board the shuttle bus as it enters the base. This transit center would serve routes P17, P19, A9, W13, and MTA Commuter Bus 907. Constructing this transit center would require coordination with DDOT concerning the impending streetcar stop.
South Capitol Street @ Firth Sterling Avenue (southbound far side)	One standard shelter with bench and trash bin, improved lighting, concrete pedestrian pad, and sidewalk with curb	To act as a waiting area for passengers boarding the P18, W14, or W4. Primarily for local, off-peak service.
Anacostia Metrorail station parking garage	Further study to determine if sufficient space is available for a shuttle turnaround area and passenger amenities.	To serve as a transfer point between Metrorail and the Joint Base shuttle



Figure 53: Current conditions at South Capitol Street and Firth Sterling Avenue (southbound near side) bus stop

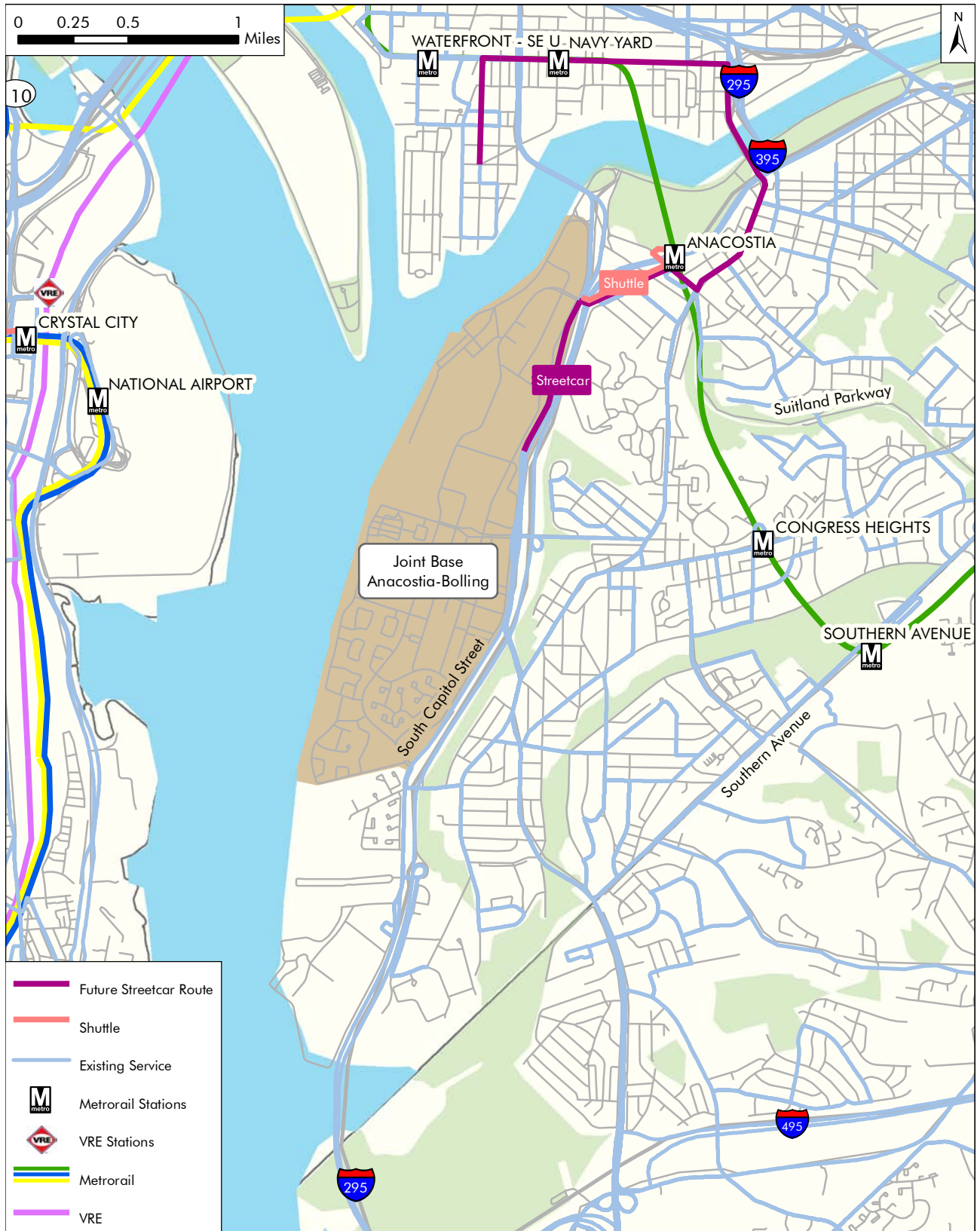


Figure 54: Current conditions at South Capitol Street and Firth Sterling Avenue (southbound far side) bus stop

### Customer Facility Improvements

Table 31 summarizes customer facility needs at JBAB. Most of these needs are at the Firth Sterling Gate, including a transit center and a streetcar stop. These two facilities may potentially be consolidated. No plans have been revealed that outline the design and amenities of this proposed streetcar stop, but amenities at streetcar stops in systems around the country are typically consistent with transit center amenities.

Because the District is encouraging the use of the Anacostia station garage as the terminus for shuttle routes, the station would require further study to determine if sufficient space is available for a shuttle turnaround area and passenger amenities. The current configuration of the parking garage's access roadway likely does not provide room for a shuttle, and since no buses or shuttles currently use this location there are probably minimal customer amenities.



Source: MWCOC, Navteq, and ESRI

Figure 55: Proposed transit service near JBAB









# Implementation

Costs  
Funding  
Implementation Strategy







# Implementation

Decisions about implementing BRAC-related transit service will be a collaborative process among the region's states and local jurisdictions, transit service providers, and BRAC installations. Decisions will differ among the sites analyzed in this study—each site creates unique transit demands, and the priority of meeting these demands varies because of each site's specific characteristics.

Several factors will be important in these decisions. One factor is who would operate the services. This report includes assumptions as to the operators of proposed service depending on bus routing and location. For example, some proposed services would stay within one jurisdiction and serve local needs. In these cases, the local jurisdiction is the suggested operator. Other proposed services may also serve more regional needs and would be operated by regional service providers including Metro, MTA, and PRTC.

Another factor is the cost of the services, which in some cases is related to the identity of the operator. To provide information to support these decisions, this study identified potential operators in the Task 4.2 technical memo; this report provides estimates of the resulting operating and capital costs. Recognizing that each site will be different, this report presents information for each site, and it also summarizes the information to demonstrate the scale of the questions the region must address.

New and enhanced transit services would require additional transit vehicles. This study estimated the number of additional vehicles needed for each proposed service. The study

also identified, where information was available, whether these additional vehicles would require expanded capacities in storage and maintenance facilities.

Finally, the study considered the steps necessary to implement the proposed services, including obtaining the financial resources needed to support them.

## Costs

This study provides order-of-magnitude cost estimates for the transit proposals that are considered feasible for implementation between FY 2011 and FY 2015. Some proposals could possibly be implemented after FY 2015, pending transit demand and available funding at that time.

Two types of costs were estimated in this study: annual operating costs and one-time capital costs. This study did not estimate costs associated with proposed DoD shuttle services.

Annual operating costs include labor, vehicle maintenance, fuel, insurance, and administration. Some vehicle costs are considered an operating cost when the operating agency contracts its service. For example, MTA commuter bus service is provided through contract with a private company, therefore MTA does not purchase its own fleet. In this situation, the cost of vehicles is annualized into overall operating costs.

One-time capital costs include acquiring additional vehicles and building customer facilities and amenities. Vehicle costs apply when an operator purchases, rather than leases, vehicles.

## Operating

Tables 32 and 33 provide a summary of the estimated net annual operating costs by site and operating agency in descending order, respectively. These costs were developed by estimating the annual revenue hours of service proposals and then multiplying by the average cost per hour and fare recovery ratio of the agency expected to operate the route.

In total, this study estimates annual net operating costs would increase by more than \$16.6 million to support the proposed transit improvements.

Table 32: Estimated near-term operating costs by site, in descending order (FY 2010 \$)

Site	Net Operating Cost
Fort Meade	\$4,861,011
Fort Belvoir	\$3,795,533
EPG	\$2,567,211
AAFB	\$1,698,537
BRAC 133	\$1,492,448
NNMC	\$1,193,745
ARNGRC	\$1,028,867
JBAB	\$0
<b>Total</b>	<b>\$16,637,352</b>

Table 33: Estimated near-term operating costs by operating agency, in descending order (FY 2010 \$)

Operating Agency	Net Operating Cost
Metrobus	\$5,607,070
Fairfax Connector	\$4,443,169
CMRT	\$3,275,043
MTA*	\$1,299,714
TheBus	\$1,170,797
DASH	\$371,157
Howard Transit	\$278,400
Ride On	\$120,169
PRTC	\$71,833
<b>Total</b>	<b>\$16,637,352</b>

\* Vehicles factored into MTA operating costs

### Capital

In addition to operating costs, this study calculated capital costs for new vehicles and their garage needs, as well as improvements to customer facilities and amenities.

### Vehicles

An estimated 97 new vehicles would be required to meet the needs

of proposed transit services, not counting spare vehicles. In order to estimate the total cost of these vehicle requirements, this study assumed a uniform cost of \$560,000 per bus, the standard cost for a typical 42-foot Metrobus. Table 34 summarizes vehicle costs by operator, and totals more than \$50 million in

Table 34: Vehicle costs by operator (FY 2010 \$)

Operating Agency	New Vehicles	Total Cost
Metrobus	29	\$16,240,000
Fairfax Connector	27	\$15,120,000
CMRT	20	\$11,200,000
TheBus	8	\$4,480,000
MTA*	6	\$0
Howard Transit	3	\$1,680,000
DASH	2	\$1,120,000
PRTC	1	\$560,000
Ride On	1	\$560,000
<b>Total</b>	<b>97</b>	<b>\$50,960,000</b>

\* Vehicles factored into MTA operating costs

Table 36: Estimated customer facility costs by site, in descending order (FY 2010 \$)

Site	Total Cost
AAFB	\$171,303
Fort Belvoir	\$155,316
JBAB	\$112,889
EPG	\$97,878
ARNGRC	\$60,638
Fort Meade	\$57,438
<b>Subtotal</b>	<b>\$655,462</b>
Factors	
Design	30%
Temporary Facilities	25%
Project Delivery	35%
<b>Grand Total</b>	<b>\$1,437,920</b>

Table 35: Detailed summary of estimated vehicle costs (FY 2010 \$)

Site	New Vehicles	Operator	Cost
Army National Guard Readiness Center	4	Metrobus	\$2,240,000
BRAC 133 (Mark Center)	4	Metrobus	\$2,240,000
	2	DASH	\$1,120,000
Engineer Proving Ground	2	Metrobus	\$1,120,000
	10	Fairfax Connector	\$5,600,000
	1	PRTC	\$560,000
Fort Belvoir	7	Metrobus	\$3,920,000
	17	Fairfax Connector	\$9,520,000
Andrews Air Force Base	2	Metrobus	\$1,120,000
	8	TheBus	\$4,480,000
	2	MTA*	\$0
Fort Meade	2	Metrobus	\$1,120,000
	20	CMRT	\$11,200,000
	3	Howard Transit	\$1,680,000
	4	MTA*	\$0
National Naval Medical Center	8	Metrobus	\$4,480,000
	1	Ride On	\$560,000
Joint Base Anacostia-Bolling	0		\$0
<b>Total</b>	<b>97</b>		<b>\$50,960,000</b>

\*Does not include the four MTA vehicles required, as they are factored into MTA operating costs

FY 2010 dollars. Based on the table's summary, the top three operators by total new vehicles account for over 83 percent of all estimated vehicle costs. Vehicle requirements and costs are summarized in more detail in Table 35.

With respect to Fort Meade express bus proposals, MTA vehicle costs are not included in either table. MTA commuter bus service is contracted and operated by a private company, therefore its vehicle costs are factored into the operating costs, which were reported in Tables 32 and 33.

### On-Site Customer Facilities

Customer facility and amenity needs were previously identified on a site by site basis, and their total costs are estimated here based on historical unit cost data. Unit costs include contractor profit, overhead allowance, and bonding. Other factors are applied as well to provide a more complete picture of overall cost to construct. These factors account for design (30 percent), temporary facilities overhead (25 percent), and project delivery (35 percent).

All on-site customer facility and amenity cost estimates are summarized in Table 36, and total more than \$1.4 million. Transit center costs were estimated using typical components (e.g. shelters, benches, signage, etc.). As such, transit center cost estimates should be considered an absolute minimum. Transit center costs will be higher if more complex designs (e.g. a small building or a large bus turnaround area) are desired or required by the funding jurisdictions.

### Transfer Metrorail Stations

Several Metrorail stations will serve as primary transfer points, though some of these stations are already facing bus bay shortages, especially during the peak periods. Metro has

identified the number of additional bus bays that are needed for the stations, which will be critical in providing convenient transfers for BRAC employees and visitors.

Costs for additional bus bays are not included in this study, as these improvements are often an inseparable part of large-scale station improvements, including expansion of bus circulation and pedestrian access.

## Funding

Funding to support new and expanded transit services could come from two sources—increasing the amounts provided through existing transit funding sources or obtaining funds from new sources. The former is a challenge, as these sources are already strained simply to support existing services. The latter is also a challenge, as there are few potential new sources, and there is typically considerable competition for them. Ultimately, funding sources will be identified by local jurisdictions during their further planning processes.

### Existing Funding Sources

#### Operating Funds

Present transit operating funds for all the transit operators in the Washington region come primarily from fare and parking revenues, state and local funds, and revenues generated by business activities such as selling advertising space on vehicles. The net operating costs identified in this study already take fare revenue into account, and revenues from business activities are relatively smaller and have limited opportunity for growth, so the remaining primary operating funding source is state and local funds. These state and local funds are severely constrained, especially when the economy is weak and tax revenues are reduced, so decisions to use them

for new and expanded BRAC-related services would have to be made in the context of funding for overall transit services.

#### Capital Funds

Present funds for transit capital investments come from federal funds, state and local funds, and other sources including private investments. Several types of federal funds could be used for the types of capital investments identified in this study, primarily federal formula or other types of federal grants.

Federal formula transit grants can be used to purchase vehicles and to build passenger facilities. Because the total amount available for the Washington region is set by formula, funds used for BRAC-related vehicles and facilities would then not be available for other transit projects.

In addition to the transit grants, other federal transportation grants can be used for transit purposes and could be applied to the construction of passenger facilities. These programs include the Congestion Management and Air Quality grants and Enhancement Program grants. The amounts available to the Washington region are also set by formula, so BRAC-related transit investments would have to compete with other projects in the region.

State and local funds are used for transit capital purposes. The local jurisdictions use these funds for vehicle purchases and to build passenger facilities. Metro typically uses these funds for projects that are initiated by a local jurisdiction. These funds would be subject to the decisions and control of the local jurisdictions.

Private funds are generally used for transit investments where the resulting vehicles or facilities would

create some benefit to the entity providing the funds. For example, the transit center at BRAC 133 is being built by the developer as part of the new buildings.

### New Funding Sources

New sources of funds could be either programs not designed specifically intended for transit purposes or those that are newly created. One type of funding program was designed specifically for roadway improvements related to military bases but is being used to support a transit project at one of the BRAC sites in the Washington region. The Defense Access Road (DAR) program typically provides funding for improvements to public roads when growth at a military facility would cause a significant increase in traffic congestion. DoD recently approved the use of DAR funds for a transit project at the National Naval Medical Center. With DoD approval, the use of DAR funds for other transit capital investments could also be possible.

Several types of federal grant programs have been created in response to the current economic situation. These programs are one-time efforts and application opportunities have passed, but they illustrate the types of other funding programs that could be created in the future.

The American Recovery and Reinvestment Act of 2009 (ARRA), which was intended to stimulate economic activity and generate jobs, provided funds for transportation programs. ARRA transit formula grants were allocated using the same formula as the regular transit formula grants described above and increased the amount of funding available in the region for transit purposes. The Transportation Investment Generating Economic Recovery (TIGER) grants under the ARRA program were





Figure 56: ARRA grants are an example of one-time federal funding opportunities

discretionary and could be used for a variety of transportation investment purposes. Other new grant programs have been suggested and considered by Congress; if they are established, they might be applicable to the investments needed to support BRAC-related transit services.

The U.S. Department of Transportation recently established a program to support urban circulators and bus “livability” projects. Projects are to be selected for funding based on several criteria—livability, sustainability, economic development, and leveraging of public investments. Competition for these funds is intense.

Specific appropriations are also possible. For example, the DoD Appropriations Act of 2010 included \$300 million to support transportation improvements at the two military medical installations in the National Capital Region—Fort Belvoir and National Naval Medical Center. In this specific appropriation, DoD will only fund transportation improvement projects in direct support of these two facilities that are selected by the state or local jurisdictions in which the medical campuses are located. This appropriation has no precedent and will require a new or modified mechanism for delivering these funds

to those states or local jurisdictions that will implement the transportation improvements. A potential mechanism for transferring the funds has not yet been defined.

### Implementation Strategy

Decisions about new and enhanced transit services must be made collaboratively by the public agencies that fund transit services, the state and local agencies responsible for transportation system operations, and the Department of Defense, though implementation planning for enhanced transit services must be led by local jurisdictions that are expected to own and operate these services.

Although there is a regional interest in ensuring the availability of adequate transit services at the sites affected by BRAC relocations, transit service decisions must be made on a site-by-site basis. Each site has unique market and service characteristics, and different public agencies have responsibility for the various sites.

Agreement on funding is obviously crucial to implementation of services, as these services will add to the cost of transit in the region. The state and local governments that operate transit services and Metro must cooperate on service decisions and the construction of customer facilities to ensure that changes are compatible with current transit services and consistent with transit development plans. Finally, DoD should participate in these decisions because they have the detailed and most up-to-date information on the characteristics of relocated employees, the timing of BRAC relocation actions, and potential funding to support the transit goals at installations. DoD also controls access to the eight sites.

New and enhanced transit services should be in place before major employee relocations occur so that

employees have access to the services from the beginning of their tenure in their new locations. A complete set of transit services should be available at the time when people are making choices about their new commuting patterns. Implementation of new services need not wait until employees have been relocated at most sites, as there are already employees located there who could take advantage of the services and provide a market to support them.

To allow services to be implemented on this schedule, more-detailed planning must begin now, and in fact it has for some sites. The implementation strategies should include identification of reliable funding sources, decisions on which service improvement alternatives to implement (especially those that can be implemented immediately), decisions on customer facility enhancements, and development of a transit marketing program to inform employees of existing and anticipated transit services, vanpool and carpool incentives, and other demand management alternatives.

Additional planning is needed with respect to bus bay assignments for new or expanded bus and shuttle service. Metro prioritizes bus bay usage according to a predefined hierarchy of services, where private or other organizations are given last priority. Where applicable, agencies or organizations seeking to utilize bus bays at Metrorail stations should begin planning with Metro as soon as possible.



